



United States Department of the Interior

FISH AND WILDLIFE SERVICE

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In Reply Refer To:
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Memorandum

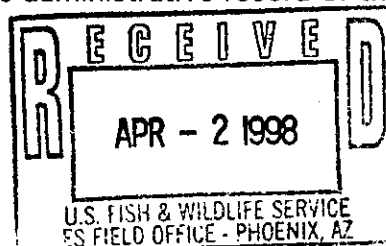
To: District Manager, Bureau of Land Management, District Office,
Phoenix, Arizona

From: Assistant Regional Director, Ecological Services, Region 2 

Subject: Biological Opinion and Concurrences for Phoenix Resource Management Plan
and Environmental Impact Statement

This responds to your September 18, 1996, memorandum to our Ecological Services Field Office in Phoenix, Arizona (AZESFO). You requested formal consultation with the U.S. Fish and Wildlife Service (Service) under section 7 of the Endangered Species Act (Act), as amended, on the *Phoenix Resource Management Plan and Environmental Impact Statement* (RMP/EIS). The Service has reviewed the RMP/EIS. This document represents the Service's biological opinion on the effects of the planning decisions in the RMP/EIS on the Pima pineapple cactus (*Coryphantha scheeri* var. *robustispinus*), Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*), Kearney's blue star (*Amsonia kearneyana*), Gila topminnow (*Poeciliopsis occidentalis*), Little Colorado River spinedace (*Lepidomeda vittata*), cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), southwestern willow flycatcher (*Empidonax traillii extimis*), and lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*). The Bureau of Land Management (BLM) has indicated in the *Biological Evaluation for Phoenix Resource Management Plan - EIS* (Biological Evaluation) that "no effect" determinations were concluded for 20 listed and 4 proposed species in the Phoenix resource planning area. The Service will not comment on these findings because, pursuant to 50 CFR 402.14(a) and (b), it is the action agency's responsibility to identify actions that "may affect" a listed species, and the Service's concurrence is not required for such findings. The Service urges BLM to maintain full documentation of the basis of these findings in its administrative record.

This opinion is issued in accordance with section 7 of the Act, as amended, (16 U.S.C. 1531 et seq.) (Act). Where the Service has deemed appropriate, this document also includes concurrences on BLM findings of "not likely to adversely affect." The opinion is based on information provided in: the *Biological Evaluation*, the *RMP/EIS*, BLM's memorandum to the Service dated June 23, 1997, amending the management direction for four species, the *Eastern Arizona Grazing Environmental Impact Statement (EIS)*, and other sources of information. A complete administrative record of this consultation is on file at our AZESFO.



FORMAT OF THE DOCUMENT

This biological opinion is organized into eight major headings: Format of the Document; Consultation History; Description of the Proposed Action; Concurrence on Not Likely to Adversely Affect Determinations; Affected Species; Incidental Take Statement; Reinitiation Statement; and Bibliography. The section on Affected Species includes both conference opinions and biological opinions for each proposed and listed species and critical habitat. Specific incidental take statements are provided in this section for each animal species. A general incidental take statement also is provided in a section at the end of the document.

CONSULTATION HISTORY

The Phoenix RMP was finalized December 1988 after undergoing public scoping since 1986. From this scoping, the document focused on six planning issues associated with BLM's management of public lands in the RMP/EIS. The preferred alternative that was selected was Alternative B. This alternative provided for BLM to designate and intensely manage public land in the Phoenix Resource Area with seven Resource Conservation Areas (RCA). Two additional issues, rangeland management and wilderness management, were addressed in two previous documents, the 1986 *Eastern Arizona Grazing EIS*, and the 1987 *Phoenix Wilderness EIS*. The decisions and alternatives in these two documents were carried forward in the RMP/EIS.

The BLM transmitted the biological evaluation to the Service in a memorandum dated September 18, 1996, with a request for the initiation of formal section 7 consultation and issuance of a biological opinion for species that BLM had determined in the biological evaluation may be adversely affected by the proposed action in the RMP/EIS. At the same time, BLM also requested concurrence on findings for several species that they determined may be affected, but were not likely to be adversely affected by the proposed action. In a memorandum to the Service dated June 23, 1997, BLM offered new management direction for the Phoenix RMP/EIS for BLM actions affecting the southwestern willow flycatcher, cactus ferruginous pygmy-owl, Kearney's blue star, and Pima pineapple cactus. This new direction included conservation measures to be implemented by BLM in Arizona to provide additional plan-level management direction for the four species.

A draft biological opinion for the RMP/EIS was transmitted to the BLM on September 2, 1997. On November 7, 1997, the Service received BLM's comments, dated October 31, 1997. The Service has given consideration to all of the BLM's comments in this biological opinion.

DESCRIPTION OF PROPOSED ACTION

The proposed action for this consultation is the direction found in the BLM's RMP/EIS. It provides direction to the BLM for the management of approximately 911,000 acres of public lands in Arizona within the Phoenix Resource Area. The Phoenix Resource Area exists in two distinct geographic areas of Arizona. The north region includes 228,700 acres of scattered land in Apache and Navajo Counties, while the southern region covers

682,640 acres in Gila, Maricopa, Pinal, Pima, Santa Cruz, and Yavapai Counties. It focuses on the resolution of six planning issues associated with the management of the public lands within the planning area. These issues are: land tenure adjustment, utility corridors and communication sites, areas of critical environmental concern, off-road vehicle restrictions, recreation management, and land classifications. Issues of rangeland management and wilderness are covered by the *Eastern Arizona Grazing Environmental Impact Statement* (1986) (Grazing EIS) and the *Phoenix Wilderness Environmental Impact Statement*. These issues were incorporated by reference in BLM's biological evaluation. Within the broad planning issues, two qualitatively different classes of actions were identified in the biological evaluation:

1. "Action Decisions," which directly affect current, on-the-ground management and do not require further site-specific section 7 consultation before implementation.
2. Plan-level guidance and direction, including actions described in the biological evaluation as "Policy/Guidance" and "Decision Providing Management Direction." These actions are more general in nature. Site specific management actions will require separate section 7 consultation before implementation.

These two classes of actions are addressed separately in the analyses in this biological opinion. The conclusion of this consultation with the issuance of this final biological opinion does not preclude the need for the BLM to consult with the Service on future site-specific project actions carried out under the Phoenix resource planning documents that: (1) the BLM determines "may affect" listed species or designated critical habitat; and (2) have not completed formal section 7 consultation prior to finalization of this biological opinion.

Also considered as a part of the proposed action for this consultation are the Arizona Rangeland Health Standards approved by the Secretary of the Interior on April 28, 1997. Additionally, the BLM has offered new management direction for the RMP/EIS to include specific conservation measures for the southwestern willow flycatcher, cactus ferruginous pygmy-owl, Kearney's blue star, and Pima pineapple cactus. The BLM will implement these conservation measures in an ecosystem-based land management approach. These conservation measures will be implemented by BLM in an ecosystem-based land management approach. A description of these measures follows:

Southwestern Willow Flycatcher

The new management direction includes specific conservation measures for the southwestern willow flycatcher. It is designed to map suitable and potential habitat on BLM administered lands, survey habitats for the presence of southwestern willow flycatchers, and provide protective measures for habitats that are currently suitable or have the potential to become suitable willow flycatcher habitat. These measures will be integrated with current management direction provided by BLM's Riparian Management Policy and the Arizona Rangeland Health Standards and Guidelines.

Both policies emphasize the importance of managing riparian systems in a proper functioning condition while enhancing potential natural communities.

The new management direction is incorporated into the consultations for:

- Lower Gila North Management Framework Plan/Grazing EIS
- Lower Gila South RMP and 1988 Amendment
- **RMP/EIS**
- Eastern Arizona Grazing EIS
- Upper Gila-San Simon Grazing EIS (Phoenix portion)
- Thirteen Allotments along the Gila River
- Kingman RMP reinitiation
- Yuma RMP

Conservation Measures for Southwestern Willow Flycatcher

The BLM in Arizona will develop and implement an action plan for the southwestern willow flycatcher that provides protective guidance for managing willow flycatcher habitat and implementing BLM authorized activities. This action plan will provide guidance to Arizona BLM Field Offices for implementing decisions authorized in their respective planning documents (RMP, Management and Framework Plans, and associated grazing EISs). Minimal features of the plan will include the following.

1. **Mapping:** Maps should convey the following information about southwestern willow flycatcher habitat managed by the BLM Field Office:
 - a. Location, size, shape, and spacing of habitat areas;
 - b. Habitat stage with respect to southwestern willow flycatchers according to the following classification: suitable-occupied, suitable-unoccupied, suitable-unsurveyed, potential in the short term (1 to 3 years), and potential in the long-term (greater than 3 years);
 - c. Status of southwestern willow flycatcher surveys for each area of suitable habitat: either the date(s) surveyed or indication that the area has not been surveyed.
2. **Southwestern Willow Flycatcher Surveys:** A list of areas to be surveyed following the most recent Service recommended protocol, along with the anticipated completion date for the survey of each area.
3. **Habitat Management Guidelines:** Management guidelines (fencing, grazing system used, or southwestern willow flycatcher habitat improvement activities) for areas at each of the habitat stages defined above for mapping. These guidelines should include:

- a. Exclusion of livestock grazing within occupied or unsurveyed, suitable habitat during the breeding season (April 1-September 1).
 - b. Management of suitable southwestern willow flycatcher habitat so that its suitable characteristics are not eliminated or degraded.
 - c. Management of potential southwestern willow flycatcher habitat to allow natural regeneration (through natural processes) into suitable habitat.
4. Cowbird Control: To reduce the likelihood of nest abandonment and loss of southwestern willow flycatcher productivity owing to cowbird parasitism associated with BLM-authorized grazing activities in or near occupied habitats, BLM will implement the following:
- a. Investigate and identify livestock concentration areas on BLM lands in the action areas that are likely foraging areas for brown-headed cowbirds within a 5-mile radius of occupied or unsurveyed suitable southwestern willow flycatcher habitat, and evaluate ways to reduce any concentration areas found.
 - b. If cowbird concentrations indicate a strong likelihood that parasitism to southwestern willow flycatcher nests is occurring or actual parasitism is documented through nest monitoring, possible cowbird foraging areas will be assessed, and appropriate control measures for cowbirds will be implemented. Evaluation of possible parasitism applies to active southwestern willow flycatcher nests on BLM-administered lands which are within 5 miles of BLM-authorized grazing activities. These efforts will be coordinated with the Service and the U.S. Animal and Plant Health Inspection Service. Monitoring and/or control activities will be conducted by qualified personnel with appropriate permits.

Cactus Ferruginous Pygmy-Owl

Conservation measures that provide additional management direction for the cactus ferruginous pygmy-owl also have been developed by the BLM in Arizona. These measures will map suitable habitats, conduct surveys to determine the presence of birds in these areas, and maintain habitat features in suitable habitats that are necessary to support breeding populations. The habitat and survey data obtained through this process will be used in an interagency effort to refine the Service's initial habitat profile and known species distribution in Arizona. Additional knowledge will also allow for refinements in mapping of suitable habitat and development of management prescriptions.

The new management direction is incorporated into the consultations for:

- Lower Gila North Management Framework Plan/Grazing EIS
- Lower Gila South RMP and 1988 Amendment
- Lower Gila South RMP, Barry Goldwater Amendment
- RMP/EIS

- Eastern Arizona Grazing EIS
- Upper Gila-San Simon Grazing EIS (Phoenix portion)
- Thirteen Allotments along the Gila River

Conservation Measures for Cactus Ferruginous Pygmy-owl

1. Habitat Description: The BLM in Arizona will work with the Service, the U.S. Forest Service, and Arizona Game and Fish Department (AZGFD) in a cooperative effort to refine the Service's habitat profile and delineation of distribution for the cactus ferruginous pygmy-owl. The habitat profile will include habitat features necessary to support breeding populations for owls and a profile for the subset of Sonoran desert scrub that is likely to support cactus ferruginous pygmy-owls.
2. Mapping: Map suitable habitat within the planning area based on the Service's most current habitat profile and distribution map (within 3 years).
3. Survey: Survey for the presence of owls on BLM-administered lands over all mapped areas of suitable habitat within a timeframe identified in an action plan developed in cooperation with the Service. Priorities for survey include:
 - a. Survey before any habitat disturbing activity (this applies to all suitable habitat, regardless of the status of the mapping effort described in number 2 above);
 - b. Areas in proximity to occupied or recently (within the last 10 years) occupied habitat;
 - c. Historic localities; and
 - d. Likely historic habitat, based on historic localities and the habitat profile.
4. Habitat Management: Maintain habitat features necessary to support breeding populations of the cactus ferruginous pygmy-owls within their historic range:
 - a. Maintain essential habitat features on suitable habitat as identified in the most current Service-approved habitat profile for the owl.
 - b. Review ongoing activities for effects on essential habitat features needed by pygmy-owls, and modify activities, where necessary, to sustain the overall suitability of the habitat for cactus ferruginous pygmy-owls. Priority will be given to activities in or near occupied or recently (within the last 10 years) occupied habitat.
5. Management direction for the cactus ferruginous pygmy-owl (including such things as habitat profiles, habitat categorization, mapping, and surveys) will be reviewed with the Service annually. Adjustments will be made, as necessary, based on these findings, other new information, or accepted recovery prescriptions.

Kearney's Blue Star

Conservation measures to provide additional management direction at the RMP level for Kearney's blue star also have been developed by the BLM. These measures are designed to provide greater specificity to overall management direction provided in the planning documents. This new management direction applies only to the RMP/EIS.

Conservation Measures for Kearney's Blue Star

1. **Formalize decision:** The BLM will formalize it's decision to eliminate livestock grazing on the Baboquivari Allotment (BA) (# 6089) by December 1998.
2. **Baboquivari Allotment:** Other landowners in the Baboquivari Allotment will work with BLM to remove any remaining unauthorized livestock from BLM-administered lands and eliminate future unauthorized livestock use (through such things as fencing or fence maintenance) in the allotment. All reasonable measures will be taken to remove trespass cattle from BLM-administered lands as soon as possible.
- 3.. **Brown Canyon Watershed:**
 - a. No livestock improvement projects (except facilities needed to exclude livestock on public lands), and no mechanical or chemical vegetation manipulation shall occur in the Brown Canyon Watershed within the Baboquivari Allotment for the purposes of managing livestock.
 - b. Planning and management for prescribed fire and wildfire suppression in the watershed of Brown Canyon shall be coordinated with the Service. A mitigation plan for each project will be developed by BLM with input from the Service. The mitigation plan must be agreed to and approved by both the Service and BLM.
4. **Monitoring:** The BLM shall monitor the status of the Brown Canyon Kearney's blue star population on their lands at least annually. Monitoring shall include looking for evidence of trespass cattle grazing in the vicinity of the population. A brief report will be furnished to the Service on the results of that monitoring in an annual report to be delivered by March 15 following the calendar year in which the monitoring occurred. The first report shall be due March 15, 1999.

Pima Pineapple Cactus

Conservation measures to provide additional management direction at the RMP level for Pima pineapple cactus were developed by the BLM. These measures are designed to provide greater specificity to overall management direction provided in the planning documents. This new management direction applies to the RMP/EIS.

Conservation Measures for Pima Pineapple Cactus

1. Nonnative plant authorization: No seeding or planting of nonnative plant species will be authorized in suitable Pima pineapple cactus habitat, or in adjoining allotments that could result in invasion of nonnative plants into Pima pineapple cactus habitat.
2. Survey and range improvement planning: Construction of range improvement projects shall be preceded by surveys for Pima pineapple cactus in all areas directly or indirectly affected by the action. Areas indirectly affected may include areas within 0.5 miles of new water sources, or areas in which cattle numbers are increased due to fences or pasturing. Surveys shall be in accordance with Service protocol. Range developments shall be planned to avoid direct impacts (death or injury) to Pima pineapple cactus as a result of construction or maintenance activities. Mitigation of indirect impacts, if any, shall be coordinated with and approved and agreed to by the Service and the BLM at the project level.
3. Prescribed fire and vegetation management: Planning for prescribed fire and chemical or mechanical vegetation management in suitable Pima pineapple cactus habitat shall be coordinated with the Service. The BLM, with input from the Service, shall develop and implement a mitigation plan for each project. The mitigation plan shall be approved and agreed to by the Service and the BLM.
4. Allotment Management Plan development scheduling: Allotment Management Plan (AMP) development and implementation shall be completed according to a schedule developed in coordination with the Service for allotments in the maintain category which contain suitable Pima pineapple cactus habitat.
5. Management of range conditions:
 - a. Actions shall be taken to maintain range conditions in good or excellent condition on public lands to maintain category allotments which have suitable Pima pineapple cactus habitat.
 - b. For allotments containing suitable Pima pineapple cactus habitat in the custodial category, the BLM will work with other landowners in the allotment to improve range condition. Actions the BLM could take with other landowners may include developing grazing strategies, planning and developing range improvement projects and vegetation management, and providing technical assistance.
6. Inventory, monitoring, and evaluations: Inventory, monitoring, and evaluations as described in the BLM's proposed action (BLM 1996) and applicable sections of the BLM Manual will be conducted in allotments containing suitable habitat. If Pima pineapple cactus is found in a custodial allotment, that allotment shall be reclassified as maintain or improve and the above measures that apply to maintain allotments shall be applied to such reclassified allotments. Inventory, monitoring, and evaluation activities and results shall be summarized in an annual report to the Service, due March 15 of the year following the calendar year in which such activities occurred. The first report shall be due March 15, 1999.

7. Strategy plan: The BLM will develop a strategy plan to avoid or minimize impacts to Pima pineapple cactus derived from minerals exploration and development on BLM administered lands. This plan will be mutually agreed upon by the Service and BLM. Plan development will be initiated within a year from the issuance of the biological opinion on the RMP/EIS.

CONCURRENCE ON NOT LIKELY TO ADVERSELY AFFECT DETERMINATIONS

The BLM has determined in the biological evaluation that the direction in the RMP/EIS, may affect, but is not likely to adversely affect Peebles Navajo cactus, Nichol's Turk's head cactus, Kearney's blue star, Gila topminnow, desert pupfish, bald eagle, and Yuma clapper rail. In the Service's review of the plan-level decisions and the action decisions in the RMP/EIS, the Service concurs with the BLM's findings for Peebles Navajo cactus, Nichol's Turk's head cactus, desert pupfish, bald eagle, and Yuma clapper rail, but does not concur with BLM's findings for Kearney's blue star, and Gila topminnow. The Service also finds that the proposed action is not likely to adversely affect peregrine falcon in the Phoenix resource planning area.

The BLM has determined in the biological evaluation that direction in the RMP/EIS may adversely affect peregrine falcons based on the agency's assessment of impacts to potential nesting habitats in the Phoenix resource planning area. However, while historic records exist for peregrines in the planning area, only incidental migrants are now known. Surveys as late as 1992 have revealed no birds within most of the Phoenix Resource Area. Surveys in 1990 have suggested that the State's peregrine populations have reached a healthy status. The Service concludes that the direction in the RMP/EIS is not likely to adversely affect peregrine falcon. At the project-level, the Service will concur with BLM's actions under the RMP/EIS if known or potential nest sites are surveyed in the same year as the action is proposed, and activities involving blasting, chainsaws, prescribed fires, or the use of loud power tools or heavy equipment is not to occur within 0.5 miles of any active peregrine falcon aerie from March 1 through July 31.

The BLM also concluded in the biological evaluation that the proposed action may adversely affect Parish's alkali grass, and in its September 8, 1996, transmittal letter requested a formal consultation on this species. On March 28, 1994, the Service published a proposal in the Federal Register (59 FR 14378) to list Parish's alkali grass as endangered. A formal conference is required by section 7(a)(4) of the Act when the proposed action is likely to jeopardize the continued existence of the species proposed to be listed. Although there are no known occurrences of this species within the planning area, there is limited potential for the species' habitat to occur in portions of Apache and Navajo counties, Arizona. A conference opinion is therefore provided in the following section of this document for Parish's alkali grass.

AFFECTED SPECIES

PARISH'S ALKALI GRASS (*Puccinellia parishii*)

Status of the Species (Range-wide)

Parish's alkali grass was first collected by Samuel Bonsal Parish at Rabbit Springs in the Mojave Desert of California in 1915. A.S. Hitchcock described it as a new species in 1928. The genus *Puccinellia* contains about 100 species of mostly north-temperate grasses (Willis and Shaw 1973); there are 10 species in the United States (Hitchcock and Chase 1950).

Parish's alkali grass is a dwarf, ephemeral, winter-to-spring, tufted annual. The leaves are 1-3 centimeters (0.4-1.2 inches) long, firm, upright, and very narrow. Flowering stems are 2-20 centimeters (0.8-8 inches) long, number 1-25 per plant, and appear from April to May. Plants grow from about March through June, but can only be positively identified during the flowering period. Plants die during the typically dry southwestern spring. By mid-July, there is usually no sign of plants at occupied sites.

Parish's alkali grass occupies a very specific habitat of alkaline springs and seeps that occur at the heads of drainages or on gentle topography at elevations of 800-2,200 m (2,600-7,200 feet). The amount of available habitat depends on the size of the spring and can vary from a few square meters to 16 hectares (40 acres). The species is dependent on continuously damp soils during its late winter to spring growing period. The number of plants in a population can fluctuate widely from year-to-year in response to growing conditions. Parish's alkali grass often grows associated with *Distichlis picata* (salt grass), *Sporobolus airoides* (alkali sacaton), *Carex* spp. (sedge), *Scirpus* spp. (bulrush), *Juncus* spp. (rush), *Eleocharis* spp. (spike rush), and *Anemopsis californica* (yerba mansa).

The geographic range of Parish's alkali grass extends about 1,000 kilometers (600 miles) east to west from Sandoval County, New Mexico, to San Bernardino County, California, and about 500 kilometers (300 miles) north to south from San Juan County, New Mexico, to Hidalgo County, New Mexico. Parish's alkali grass is currently known from 24 sites. There are 15 sites in New Mexico, 8 in Arizona, and 1 in California. In the proposed rule to list the species (59 FR 14378; March 28, 1994), it had been reported from ten sites, although one of these sites has subsequently been determined to represent a misidentified specimen.

The known sites in New Mexico have increased to 15 from the one that was reported in the proposed rule. Surveys by the New Mexico Forestry and Resources Conservation Division under a cooperative project through section 6 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.) led to the discovery of 11 new sites (Sivinski 1995). The new sites occurring are one in Cibola, one in Hidalgo, six in McKinley, and three in Sandoval Counties. An additional new site in San Juan County was reported based on a student collection (K. Heil, San Juan College, Farmington, New Mexico, pers. comm. 1995). The identification was confirmed by Dr. Kelly Allred, a New Mexico State

University expert on grasses. The BLM, Rio Puerco Resource Area reported two additional sites in Sandoval County (in litt. 1996).

The known sites in California have decreased to one from the two that were reported in the proposed rule. Dr. Andrew Sanders of the University of California, Riverside, has identified the plants from Edwards Air Force Base in Kern County as *Puccinellia simplex* rather than *P. parishii* as reported in the proposed rule (C. Rutherford, U.S. Fish and Wildlife Service, in litt. 1995).

The known sites in Arizona have increased to eight from the seven that were reported in the proposed rule. The new site is located in Yavapai County about 240 km (150 mi) southwest of the nearest Arizona site. This site was discovered in April, 1996, by A.L. Reina and T.R. Van Devender, with the specimens identified by C.G. Reeder (A. Brooks, U.S. Fish and Wildlife Service, pers. comm. 1996).

On March 28, 1994, the Service published a proposal in the Federal Register (59 FR 14378) to list Parish's alkali grass as endangered with no critical habitat. The biological data in Phillips and Phillips (1991), and the field investigations of Hevron (Navajo Natural Heritage Program, pers. comm. 1993), Rutherford and Thomas (U.S. Fish and Wildlife Service, pers. comm. 1993), and Sivinski (1993) supported the proposed listing. However, since the proposal, 12 additional sites have been discovered in New Mexico and 1 site in Arizona. The Service received a public hearing request, and a notice to announce the public hearing and reopen the comment period appeared in the Federal Register on August 30, 1994 (59 FR 44700). A public hearing was held on September 15, 1994, in Tuba City, Arizona.

Status of the Species (In the Action Area)

There are no known occurrences of Parish's alkali grass in the Phoenix resource planning area, but potential habitat likely exists on public lands in Apache and Navajo Counties, Arizona. Although springs, seeps, and streams that may contain potential habitat in these counties are rare, they have not been surveyed. The land ownership pattern in this area is mixed. Public lands comprise a small portion of the total area while State and private lands make up the majority of the area. Legal access to many of the public land parcels does not exist, and some access to private lands is limited by locked gates. This tends to impede the ability of the BLM to survey potential habitat in the affected area.

The habitat at all known sites for Parish's alkali grass has been highly modified through capture of water for livestock, agriculture, or intensive grazing. Some occupied spring sites are severely degraded by cattle, a condition that has existed for decades. Yet the plants persist. De-watering of springs rather than spring degradation appears to be the major threat to the species.

Effects of the Action

As mentioned previously, two qualitatively different classes of actions are identified in the RMP/EIS: "Action Decisions" and plan-level guidance and direction, including actions

described in the biological evaluation as "Policy/Guidance" and "Decision Providing Management Direction." Both classes of actions are considered in this analysis.

Policy/guidance providing management direction in the RMP/EIS that have insignificant, beneficial, or no effect on Parish's alkali grass are: land tenure; special management areas; motor vehicle management; land use authorizations; minerals management; cultural resource management; land classification; general environmental management; soil, water and air resource management; wildlife and special status species and riparian management; and fire management. Under land tenure and land authorization direction, the biological evaluation identifies action decisions that have potential for impacting Parish's alkali grass. These are: the retention of 6,880 adjacent to Petrified Forest National Park; designation of 391,803 acres of federal surface outside the seven Resource Conservation Areas (RCA) as suitable for disposal through state indemnity selection or state or private exchange; designation of 45,000 acres of Federal surface outside the seven RCAs as suitable for disposal through state indemnity selection, state or private exchange or sale; identification for disposal all subsurface mineral estate underlying federal surface designated for disposal outside the seven RCA, Cooperative Recreation Areas and Recreation and Public Purposes Act I (R&PPA) lands; transfer of 280 acres at Zion Reservoir to the AZGFD for the protection of wildlife values under the R&PPA; and leaving open for communication site development land identified for disposal; continued consideration of communication site applications on land identified for disposal until disposal takes place.

Suitable habitat for Parish's alkali grass may be affected by the BLM's grazing program. The desert springs and seeps that provide habitat for Parish's alkali grass are a limited resource typically heavily used by livestock. The impact on Parish's alkali grass from heavy use of springs is uncertain. Projects to protect spring sources and improve them for both wildlife habitat and livestock water will also impact Parish's alkali grass habitat, again with uncertain results for the species. Several localities have been used by livestock for many years, yet the species persist. Any program such as salt cedar control or piñon-juniper removal that may increase spring water has the potential to improve or increase habitat for Parish's alkali grass.

Cumulative Effects

Cumulative effects are those adverse effects of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Effects of past Federal and private actions are considered in the Environmental Baseline.

Conclusion

Recent discoveries indicate that Parish's alkali grass, although still rare, is more common than indicated by earlier data. Also, there are indications from the newly discovered populations that Parish's alkali grass may be able to occupy a somewhat broader range of habitats than previously thought. Although the Service agrees that the majority of desert springs in the Southwest have been modified for various uses, some of the newly

discovered populations cast doubt on the negative effects of livestock on Parish's alkali grass. Severe overgrazing and trampling have occurred for decades at several springs where Parish's alkali grass is present and there is speculation that disturbance around springs may actually reduce competition and create open microsites for the species.

After reviewing the current status of Parish's alkali grass, the environmental baseline for the action area, and the effects of the proposed cumulative effects, it is the Service's conference opinion that the continuation of activities under the direction of the RMP/EIS is not likely to jeopardize the continued existence of the species. This finding is based on: (1) Recent discoveries of new populations; (2) indications that the species may occupy a broader range of habitats than previously believed; and (3) some indication that grazing, may actually be of some benefit to the species. No critical habitat has been proposed to be designated for this proposed species.

PIMA PINEAPPLE CACTUS (*Coryphantha scheeri* var. *robustispinus*)

Status of the Species (Range-Wide)

The final rule listing Pima pineapple cactus as endangered was published September 23, 1993 (58 FR 49875); no critical habitat has been designated. Factors contributing to this listing included habitat loss, degradation, and fragmentation; distribution characteristics and plant rarity; illegal collection; and difficulties in providing protection of an area large enough to maintain a functioning population. The biological information summarized below is from the proposed and final rules, and other sources.

Pima pineapple cactus is a low-growing hemispherical cactus with adults varying in stem diameter from 2.0 to 8.3 inches and height from 1.8 to 18.0 inches. Individuals are considered adults when they exhibit the ability to reproduce with the presence of flowers. Plants can be either single or multi-stemmed with yellow flowers blooming with the summer rains. Clusters of Pima pineapple cactus stems are formed primarily from vegetative clones produced at the plant base (Benson 1982, Roller 1996). The diagnostic characteristic of this taxon is the presence of one stout, straw-colored, hooked central spine. Radial spines extend laterally around the central spine and average 10 to 15 spines on large cacti and 6 on small cacti (Benson 1982).

Pima pineapple cactus occurs south of Tucson, in Pima and Santa Cruz counties, Arizona, and adjacent northern Sonora, Mexico. It is distributed throughout both the Altar and Santa Cruz Valleys and in low lying areas connecting the two valleys. Generally, the cactus grows on gentle slopes of less than 10 percent and along the tops of alluvial bajadas nearest to the basins coming off of steep, rocky slopes. The plant is found between 2,362 and 4,593 feet elevation (Phillips et al. 1981, Benson 1982, Ecosphere Environmental Services, Inc. 1992) in vegetation characterized by Brown (1982) as both the Arizona upland subdivision of the Sonoran desertscrub and semi-desert grasslands.

Groups of flowers begin to bloom for single day periods following 5 to 7 days after the first monsoon rains. Flowering is triggered by as little as 0.039 inches of precipitation. Generally flowers begin opening mid-morning and close at dusk. Adult plants will bloom

(single flowers or groups of flowers) 1 to 3 days each year, generally finishing by the end of August. Cross-pollination produces significantly more viable seeds than self-pollination.

Fruits are mature within 2 weeks following successful pollination and nearly all are removed from the plant by October or November. Germination has been observed in the field during the summer monsoon season (Roller 1996).

The seedling size class of Pima pineapple cactus ranges in diameter from 0.3-0.4 inches after their first year's growth following the summer monsoons. Sub-adult classes are larger than seedling classes, but are not reproductively active and generally are less than 2.0 inches in diameter when measured after the summer rains (Roller 1996).

The establishment phase of Pima pineapple cactus may be the stage that limits recruitment into populations. Evidence presented to support this conclusion includes the abundance of flowers, fruits, and viable seed, and the rarity of seedling presence at different sites throughout the plant's range (Roller 1996). Other research has documented the establishment phase of other Sonoran cacti species as being critical for survival to reproductive maturity (Steenbergh and Lowe 1977).

Pima pineapple cactus habitat supporting relatively dense, successfully-reproducing populations with high plant vigor often occur in a transition zone between Sonoran desert scrub and semi-desert grassland. This transition is characterized by mid-sized mesquite, half shrubs (snakeweed, burroweed, and desert zinnia), and patches of native grass and scattered succulents. Because the populations are healthier in this transition zone, conservation within these areas is very important (Roller and Halvorson, in press).

This habitat containing vigorous, dense populations is not uniformly distributed through the plant's range. Plant abundance and available habitat has been roughly estimated based on elevation, topography, and range boundaries. A more advanced technical approach would provide more reliable habitat and range information. Pima pineapple cactus distribution is patchy, widely dispersed, and densities are highly variable. Relatively high densities have only been documented at three sites. Two of these sites are very small; plant densities range from one to three plants per acre. However, densities across the majority of the plant's range vary between 0.05 and 0.2 plant per acre (Mills 1991; Ecosphere 1992; Roller 1996)

Based on surveys conducted between September 1992 and 1995, most habitat occurs in the northern portion of the plant's range. The species is distributed in widely scattered habitat patches throughout the southern portion of its range. Land areas surrounding and including parts of Green Valley and Sahuarita, as well as parts of the San Xavier District of the Tohono O'odham Nation, support one of the two largest and most extensive populations remaining. The second large population is on the King Anvil Ranch, on State lands along the northern edge of the Altar Valley near Three Points.

In the Green Valley/Sahuarita population, habitat loss and fragmentation, primarily due to urbanization and mining, has occurred at a rapid rate, particularly within the last 3 years. This area is critical for conservation. Habitat fragmentation may be an important factor

limiting reproduction of this cactus and the distance between plants must not exceed a distance that would preclude transfer of pollen among cactus by pollinators. Viable seed is initiated by out-crossed pollination in this taxon. Residential development within and surrounding Green Valley is expected to increase in the future. It is expected that habitat losses will likely double within the next 3 years based on documentation from 1993 to 1995 (Roller 1996) and proposed, future development.

Threats due to residential and minerals development directly and immediately impact individual cacti, alter vegetation, geomorphology, local soil properties, and alluvial watershed characteristics. Pima pineapple cactus individuals would not likely survive such activities, nor would populations recover within project areas.

Overgrazing by livestock, illegal collection, and fire-related interactions involving exotic Lehmann lovegrass, *Eragrostis lehmanniana*, are three additional threats which may negatively affect Pima pineapple cactus populations (USDI 1993).

The effects of these threats are not easily separated from compounding factors such as potential climatic change and urbanization (McPherson 1995). We do not know if the majority of populations of Pima pineapple cactus can be sustained, given the current condition of plant communities throughout the range of this species. Thus, the need for information on what is limiting this plant's distribution under current habitat conditions is important.

Acquisition of baseline information began with surveys documenting the presence of Pima pineapple cactus as early as 1935. More intensive surveys were initiated in 1991. Other research initiated in 1993 further investigated the reproductive biology, distribution, fire effects, and mortalities associated with various threats. Therefore, the best available baseline information is relatively recent and may not represent actual changes in distribution or population degradations; actual changes were likely greater than the numbers presented here in such a narrow timeframe. Further demographic monitoring across the range will be important for the further development of this baseline information.

A total 2,384 individual Pima pineapple cactus have been located by surveys conducted since 1935, with the majority found since 1991 using a more intensive methodology. Across the range of the species, surveys have documented densities from 3.0 to 0.05 plants per acre. Based on the range of the species, elevational limits, and topography, approximately 1,152,000 acres of potential habitat currently exists. Using density estimates across the species' range and acres of potential habitat, it is suggested the total population for the taxon may be around 429,000 cacti, if survey data are representative of densities over the range of the species (Roller 1997). Based on relatively small survey sizes, the skewed nature of the surveys, which were not standardized and were influenced by scale differences, and the patchy, widely dispersed, and erratic nature of Pima pineapple cactus distribution, this value is only an estimate at this time.

Status of the Species (In the Action Area)

The species occurs in Pima and Santa Cruz Counties. Urban spread, road construction, illegal collecting, introduction of exotic plant species, and habitat degradation from past and present land uses have reduced populations. The range of the Pima pineapple cactus in the action area is surrounded by the Santa Rita Mountains on the east, the Baboquivari Mountains on the west, the city of Tucson on the north, and the U.S. border on the south. The southern most extent of the range actually extends into Mexico a few miles. Within this overall range, the species occurs in various soil types. Although plants are assumed to occur south of Tucson and west of the Tohono O'Odham Indian Reservation, more vegetation surveys are needed on public lands to determine the actual scope of potential habitat. A portion of the potential habitat is protected by wilderness designations for the Baboquivari and Coyote Mountains.

The primary threat to the Pima pineapple cactus is habitat loss, fragmentation, and alteration from residential development and mining. From 1993 to 1995, 992 acres of habitat were lost in the Green Valley and Sahuarita region, an area critical for future recovery. Approximately 90 percent of habitat loss occurred on State and private lands. Development projects are typically not subject to section 7 consultation because they lack Federal involvement. As a result, little in-situ conservation or mitigation occurs in regard to these projects. The majority of the best habitats for this species is reasonably certain to be converted by urbanization or mining development in the foreseeable future.

Other threats to the species include activities associated with livestock grazing, off-highway vehicle use, proliferation of roads and trails, natural and prescribed fire, and illegal collection. Adverse effects of grazing include trampling by livestock; habitat loss and degradation associated with construction of range improvements; vegetation manipulations, such as chaining, prescribed fire, seeding with nonnative plants; and heavy grazing that results in changes in vegetation communities, hydrology, and microhabitats in uplands where the species occurs.

Areas surrounding and including parts of Green Valley and Sahuarita, as well as parts of the San Xavier District of the Tohono O'Odham Nation, may be the most important regions for conservation and recovery of this species. Surveys conducted from 1992 to 1995 and a quantitative analysis technique established a pattern of greater population densities and higher ranks of cactus vigor and reproduction occurring within the semi-desert grasslands/Sonoran desertscrub in this area.

Effects of the Action

As mentioned previously, two qualitatively different classes of actions are identified in the RMP/EIS: "Action Decisions" and Plan-level guidance and direction, including actions described in the biological evaluation as "Policy/Guidance" and "Decisions Providing Management Direction." Both classes of actions are addressed in this analysis.

Policy/guidance providing management direction that have insignificant, beneficial, or no effect on Pima pineapple cactus are:

- special management areas;
- land tenure;
- motor vehicle management;
- cultural resource management;
- land classification;
- general environmental management;
- soil, water and air resource management;
- wildlife and special status species and riparian management;
- land use authorizations;
- wild and free-roaming burro management.

Under land use management, minerals management, rangeland management, and wilderness management, some action decisions that could result in impacts to Pima pineapple cactus in the RMP/EIS include: designation of an area of environmental concern with an activity plan in the Baboquivari Mountains; retention, acquisition, and consolidation of public lands in the seven RCAs initiation of mineral withdrawal, prohibition of land use authorizations, and prohibiting motorized vehicles in areas of environmental concern; and prohibition of surface occupancy for oil and gas development in an AEC. Potential habitat in the Baboquivari and Coyote Mountains is afforded protection by wilderness protection. These actions are expected to result in accrued benefits to the Pima pineapple cactus. Also, the BLM's new management direction for the RMP/EIS provides specific conservation measures for the protection of Pima pineapple cactus.

Other decisions in the RMP/EIS that pertain to the species include: leaving lands containing potential pineapple cactus habitat outside the RCA open to consideration for communication site development; the designation of lands and subsurface mineral estate outside the RCA as suitable for disposal; plans to acquire legal access to the Baboquivari AEC, and the designation of two parcels as suitable for transfer to Pima County under the Recreation and Public Purposes Act. Although not assessed in the RMP/EIS or the *Eastern Arizona Grazing Environmental Impact Statement*, the BLM has consulted on the Safford District Grazing EIS which assesses the impacts of grazing on the Pima pineapple cactus. As a part of the RMP/EIS, rangeland management impacts on the species also are considered here as a part of this consultation.

Potential suitable habitat occurs within BLM grazing allotments in the Phoenix resource planning area (Roller 1996), although distribution and abundance of the cactus throughout much of the habitat in the allotments is unknown due to a lack of survey data. Although little is known regarding the effects of low to moderate levels of livestock grazing on Pima pineapple cactus distribution, a study is underway at the Coronado National Forest to quantify the effects of grazing on the species. This taxon is patchy in distribution and widely dispersed. It occupies upland, relatively xeric soils (Roller 1996), which are used less by livestock than streams or wash bottoms. Heavy grazing may threaten populations by increasing the probability of trampling, as well as altering surface hydrology and increasing erosional rates, that in turn may affect seed dispersal or seedling establishment. Habitat effects of heavy grazing could include erosion, hydrologic and micro-climatic changes, and invasion or expansion of exotic grasses due to livestock preferences for native grass species over exotics.

To what extent grazing may directly or indirectly effect the cactus by impacting the structure and function of the ecosystem is not well studied. However, heavy grazing, fire suppression, and drought in arid grassland ecosystems have all been hypothesized as being the cause, either individually or collectively, of changes in arid grassland community structure and function (Bahre 1985).

Cryptobiotic crusts, consisting of lichens, fungi, algae, mosses, and cyanobacteria, are important soil stabilizers of the southwestern deserts (Anderson et al. 1982; Belnap 1992). Although the relationship between Pima pineapple cactus and cryptobiotic crusts has not been investigated, these crusts decrease wind erosion (Brady 1974 in Anderson et al. 1982) and have a significant effect on soil stability and rates of water infiltration (Kleiner and Harper 1972; Kleiner and Harper 1977; Belnap 1992; Belnap and Gardner 1993).

Cyanobacterial soil crusts have been shown to increase soil retention through absorbency of the polysaccharide sheath material that surrounds groups of living filaments. These crusts also act to increase the availability of many nutrients in sandy soils (Belnap 1992; Belnap and Gardner 1993).

Studies at Arches and Canyonlands National Parks demonstrated a dramatic decrease in nitrogen input into the system with virtually no nitrogenase activity detectable in cyanobacterial populations after a single footprint disrupted the soil crust (Belnap, unpublished report). At Arches National Park, fescue, *Festuca octoflora*, had 8 percent lower total nitrogen content in its tissues, and *Streptanthella longirostris* had 30 percent less (Belnap, unpublished report) after trampling occurred.

In Utah, the bulk of microbiotic tissue in sandy soils consisted of abandoned, buried cyanobacterial sheath material, which, although abandoned, may still reduce soil erodibility and enhance moisture and nutrient retention of the soil (Belnap 1993). Repeated trampling of this dry material pulverizes the abandoned sheath and results in permanent destruction of the crust if no living filaments are present to re-secrete the gelatinous material (Belnap, 1993). Areas trampled by humans in Arches National Park exhibited a 90 percent lower infiltration rate than untrampled areas resulting in overall water loss to the system (Belnap unpubl. report). Therefore, trampling may result in the reduction of soil stability, soil fertility, and soil moisture retention (Belnap 1992). Recovery of cryptobiotic crusts may take a long time, especially for the lichen and moss components of the crust (Belnap 1993). Cryptobiotic crusts will not likely recover significantly from previous disturbances under a seasonal grazing regime. Without these crusts, the reestablishment of the potential natural community may not occur (Menke 1988).

Grazing caused considerable damage to cryptobiotic crusts resulting in less stable soil conditions at Navajo National Monument, Arizona (Brotherson et al. 1983). In Utah, Marble and Harper (1989) found that late winter grazing caused significant reductions in cryptogamic crusts. In his review of soil conditions on a large cattle enclosure within the Coso area of the Naval Weapons Center in California, Menke (1988) stated that "the enhanced cryptobiotic crust that will result from livestock exclusion . . . will substantially alter the (plant) species composition of the area and likely increase forage productivity and habitat favorable to the Mojave ground squirrel." Additionally, cryptobiotic crusts provide

improved microsites for seedling establishment and aid in stabilizing surface soils by reducing wind erosion (Menke 1988; Harper and St. Clair 1985). Menke (1988) suggested that enhanced cryptobiotic crusts tend to change soils and plants in a way that facilitates development of potential natural communities. He added, "Many of the native plants and animals should increase in abundance as the community develops." In conclusion, effects of grazing on cryptobiotic crusts may cause changes in soil stability, nutrient content, and soil moisture retention that may be detrimental to the Pima pineapple cactus.

The effects of livestock grazing on desert soils and vegetation have been documented by numerous authors. Grazing practices can change vegetation composition and abundance, and cause soil erosion and compaction, reduced water infiltration rates, and increased runoff (Klemmedson 1956, Ellison 1960, Arndt 1966, and Gifford and Hawkins 1978) leaving less water available for plant production (Dadkash and Gifford 1980). Livestock grazing can result in decreased shrub cover (Webb and Stielstra 1979) and desirable shrubs (Orodho et al. 1990), or in semi-desert grasslands can result in replacement of grasses with shrubs (Bahre 1995). Weedy exotics, such as Lehmann's lovegrass, *Eragrostis lehmanniana*; split grass, *Schismus arabicus*; checker fiddleneck, *Amsinkia intermedia*; filaree, *Erodium cicutarium*; and cheatgrass, *Bromus rubens*; have benefitted from grazing, while perennial bunchgrasses, which are highly palatable grazing forage, have become less abundant in many areas (Berry and Nicholson 1984, Kie and Loft 1990, McClaran and Anable 1992). The intensity of damage to soil caused solely by cattle is assumed to be directly proportional to the animal unit month (AUM) of forage used per pasture (BLM 1980). The most severe impacts occur in areas used for loading and unloading cattle, supplemental feeding, watering sites, and salt licks. In these areas, effects to habitat, such as vegetation removal, soil compaction (Orodho et al. 1990) and resultant reduction in soil moisture (Daddy et al. 1988), and presumably crushing of cacti, are prevalent.

Pima pineapple cactus populations characterized by relatively high plant densities, good reproduction, and high levels of cactus vigor are typically found in upland associations with mid-sized mesquite shrubland with an assortment of other succulent species and native bunch grasses (Roller and Halvorson, in press). Many of the species dominant in this vegetation type are associated with grazing; i.e., are known as "increasers" under some grazing practices. In these areas, supporting apparently healthier populations of Pima pineapple cactus, some pastures with lower levels of grazing support greater native grass coverage and species diversity. Thus, establishing standards and guidelines for grazing practices that are monitored may allow for the development of further useful information regarding these relationships.

Some level of soil movement or disturbance is required for seed germination because the seed will not germinate on the surface; it generally germinates at a depth between 0.2 to 0.6 in. (Roller 1996). Presence of seedlings or sub-adults have been documented at few locations throughout the plant's range. However, all but one of the known locations with seedlings or subadult plants had been grazed within 3 years of the observation. Whether light to moderate grazing practices provide the appropriate level of soil movement to cause seed germination has not been determined. The study established on the Coronado National Forest should provide some insight on seed germination relative to specific grazing intensities.

The invasion of Lehmann's lovegrass combined with fire is a threat to populations. Continuous distribution of fuels and greater biomass have been hypothesized as increasing fire intensity across semi-desert grasslands, including the often bare-ground refugia in which Pima pineapple cactus occur. Under these conditions, mortality of Pima pineapple cactus following fire is elevated (Roller and Halvorson, in press). Research shows that fire increases Lehmann lovegrass distribution and suggests fire intensity and fire frequency increases with Lehmann lovegrass invasion (McPherson 1995). Grazing can result in increased abundance of Lehmann's lovegrass relative to the abundance of native grasses (McClaran and Anable 1992). Lehmann's lovegrass has been seeded in many areas in an attempt to improve rangelands for livestock (Bahre 1995).

The total acres of suitable habitat on public lands in BLM grazing allotments is unknown but is somewhat less than 37,129 because some public lands within the allotments are outside of the range of the cactus or in habitats, such as montane slopes, which are not suitable.

The BLM's action includes grazing on both Federal and non-Federal lands. Although the BLM has no discretion over activities on non-BLM lands in the allotments, grazing systems and prescriptions on BLM lands may influence the way cattle are grazed on non-Federal lands. In these cases, grazing on the non-BLM lands in the allotment may be interrelated or interdependent to grazing on the BLM lands.

The percentage of BLM lands in an allotment is a determining factor in whether grazing on non-BLM lands in an allotment is interrelated or interdependent to the proposed action. "Custodial" allotments are those in which the BLM is a minor landholder and management is driven primarily by grazing systems and prescriptions on the non-BLM portions of the allotments. On these allotments, grazing on the non-BLM portions of the allotment are not considered interrelated or interdependent to the proposed action. "Maintain" allotments are those where the BLM is a major landholder. The Service considers grazing in the non-BLM portions of the allotments interrelated and interdependent to the proposed action.

As discussed in the preceding document section on Proposed Action, the BLM has developed specific conservation measures to provide new management direction for Pima pineapple cactus. In summary, these include: nonauthorization of seeding of nonnative grasses in suitable cactus habitat; cactus surveys prior to range improvement projects; BLM's development of a mitigation plan for prescribed fire, chemical, or mechanical vegetation management in suitable habitat; development and implementation of AMP's coordinated with the Service; the taking of actions to maintain range conditions in good to excellent condition on allotments containing suitable cactus habitat and classified in the "maintain" category on public lands; working with landowners to improve range conditions in allotments in the "custodial" category and that contain suitable cactus habitat; inventory, monitoring, and evaluation of allotments containing suitable habitat; and development of a strategic plan to avoid and minimize impacts to the species.

Cumulative Effects

Cumulative effects are those adverse effects of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and are not considered cumulative to the proposed project. Effects of past Federal and private actions are considered in the environmental baseline.

The primary cumulative effects contributing to extirpation of individuals and large scale habitat loss has been residential development. Continued development of private and State lands in and near Green Valley and Sahuarita is expected. Livestock grazing and associated impacts are expected to occur on State and private lands outside of the allotments addressed herein.

Conclusion

After reviewing the current status of Pima pineapple cactus, the environmental baseline for the action area, and the effects of the proposed cumulative effects, it is the Service's biological opinion that the continuation of activities under the direction of the RMP/EIS is not likely to jeopardize the continued existence of the Pima pineapple cactus. This opinion gives consideration to the known effects of grazing on the cactus, particularly where cattle congregate in occupied Pima pineapple cactus habitat, and the BLM's new management direction that includes survey and range improvement planning to avoid impacts to the species and its habitat from these activities. No critical habitat has been designated for this species.

Incidental Take

Sections 7(b)(4) and 7(o)(2) of the Act do not apply to the incidental take of listed plant species. See complete statement at end of this document in section called "Incidental Take Statement."

Conservation Recommendations

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for Pima pineapple cactus. In furtherance of the purposes of the Act, we recommend implementing the following actions:

1. The BLM should establish cattle exclosures with controls in areas of relatively high densities of Pima pineapple cactus to investigate the effects of grazing on the cactus.

2. The BLM should conduct surveys to further clarify the distribution of Pima pineapple cactus in all allotments containing suitable habitat.
3. The BLM should develop techniques for the reestablishment of native grasses in the allotments.
4. The BLM should fund research of the pollination biology of Pima pineapple cactus, which would contribute to our understanding of how habitat fragmentation affects this plant.
5. The BLM should monitor allotments for illegal collection of Pima pineapple cactus and report to the Service results of such monitoring.
6. The BLM should map the occurrence and abundance of Lehmann's lovegrass within the allotments.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendation.

ARIZONA HEDGEHOG CACTUS (*Echinocereus triglochidiatus* var. *arizonicus*)

Status of the Species (Range-wide)

The Arizona hedgehog cactus as described (Benson, 1982) was listed as an endangered species without critical habitat on November 26, 1979 (44 FR 61556). This cactus was only known from the general vicinity of the type locality, a limited area along the Gila/Pinal county boundary in central Arizona, roughly between the towns of Miami and Superior. Recent surveys and other studies have added information to further define the range of the species to include the Pinal, Dripping Springs, Superstition, and Mescal mountains. Within this distribution, Cedar Creek Associates (*in* Tonto National Forest 1996), using all available distribution and ecological data, has estimated that Arizona hedgehog cactus occupies approximately 18,900 acres (30 square miles) of habitat.

Arizona hedgehog cactus habitat consists of exposed bedrock or boulders within Interior Chaparral, Madrean Evergreen Woodland, and Desert Grassland plant communities in an elevational range of approximately 3,400 to 5,300 feet. This habitat is characterized by rugged, steep-walled canyons, and boulder pile ridges and slopes. Typically, the cactus is scattered on open, rocky exposures, rooting in shallow soils and narrow crevices among the boulders (Phillips *et al.*, 1979; USDI, 1979; USFWS, 1985). Arizona hedgehog cactus may be found beneath the understory of shrubs, but moderate to high shrub densities and associated deeper soils tend to preclude the cactus (Tonto National Forest, 1996). Substrates on which Arizona hedgehog cactus are normally found include Orthoclase-rich granite of late Cretaceous age, primarily Schultze Granite. Also found in mid-Tertiary age dacite, and to a lesser extent in Pinal schist (AZGFD, 1994; Tonto National Forest, 1996).

Arizona hedgehog cactus begins to produce flower buds in early April with anthesis (flowering) from late April to mid-May. Weather conditions can hasten, prolong, or delay flowering by several weeks (AZGFD 1994). The species is an obligate outcrosser and likely pollinators include insects, primarily bees, and perhaps hummingbirds (Ferguson 1989). Fruits are present from May through June. Approximately 100 small seeds are produced per fruit with several fruits often occurring per plant. The amount of variation in annual seed production, and seed viability and longevity are unknown (Phillips 1985). Seed dispersal is expected to be by birds and mammals (Tonto National Forest 1996). Germination can occur in mid-summer. The seeds do not appear to require after-ripening or have other special germination requirements in addition to protection from extended direct sunlight and extreme temperatures [above 43°O C (110°O F)] (Phillips 1985). Natural insect predators include borers and leaf-foot bugs (Coreidae) which attack the stems. Also, rodents may gnaw on stems and eat the fruits (which may contribute to dispersal). Root rot may also be an important cause of mortality (Crosswhite 1976; Phillips et al. 1979).

Status of the Species (In the Action Area)

The Tonto National Forest, Globe Ranger District, manages approximately 90 percent of the known occupied habitat of Arizona hedgehog cactus. This cactus also occurs on Arizona State Land Department trust lands, BLM administered lands, and private lands. A substantial population of Arizona hedgehog cactus is found within the Superstition Mountain Wilderness Area (Tonto National Forest 1996). Direct access to a large portion of the cactus' range is very limited due to the rugged topography and remote nature of these habitats. Cedar Creek Associates (1994; and *in* Tonto National Forest 1996) has estimated that there are over 250,000 individual Arizona hedgehog cactus plants. This estimate is conservative because it does not include up to several thousand plants occurring in satellite populations disjunct from the main distribution of the species and actual sample counts tend to under-count smaller plants.

Arizona hedgehog cactus has horticultural value and is commercially available from cactus and succulent dealers. Illegal collection of Arizona hedgehog cactus plants has been identified as a primary threat to the species (USDI 1979). Removal of plants may occur for landscaping or for suspected hallucinogenic purposes. The extent of possible collection pressures remains uncertain. Comparisons of isolated and roadside populations suggest there may be diminished population levels at easily accessible sites. Those plants most susceptible to collection would be those that could be easily dislodged from the soil rather than those growing within the rock matrix. However, as part of the intensive surveys conducted within the project area by Cedar Creek Associates (1994; and *in* Tonto National Forest 1996), including portions of the Highway U.S. 60 corridor, reduced densities along the highway were not discernable when compared with plant densities from more remote locations. Seed collection is also a potential threat. Any effect collecting of plants and seeds may have on the long-term reproduction and survival of Arizona hedgehog cactus is not known (USFWS 1985). However, any effects would be expected to be site-specific. If there is a major change in the market demands for Arizona hedgehog cactus, either for landscaping or hallucinogenic purposes, it could result in substantive impacts to the cacti.

Construction of Highway U.S. 60 and its later realignment destroyed Arizona hedgehog cactus and its habitat. Cedar Creek Associates (1994) estimated that 2,348 cacti were lost from approximately 67 acres of presumed occupied habitat, and an additional 85 acres of presumed unoccupied but potential habitat was eliminated by highway construction. These estimates were based on habitat characteristics, including vegetation type, topography, and parent geologic material of adjacent sites and the recorded densities of Arizona hedgehog cactus in similar habitats. The construction of power lines parallel to the highway and the Silver King substation for the Salt River Project resulted in the loss of an additional 18 acres of occupied habitat (Cedar Creek Associates 1994). Six plants were removed and transplanted by Boyce Thompson Arboretum in 1978 before construction of the Silver King substation (Phillips et al. 1979).

Livestock grazing may lead to impacts to Arizona hedgehog cactus due to direct trampling of plants and/or through habitat degradation. Physical damage to cacti by livestock has been documented (Tonto National Forest 1996). However, Cedar Creek Associates (1994) notes that plants damaged by livestock are observed primarily in those areas most accessible to livestock where they occur at a rate of approximately 1 out of every 400 to 500 plants observed. Habitat degradation due to livestock grazing which resulted in impacts to Arizona hedgehog cactus have not been documented. Damage and direct herbivory by javelina appears to be frequent and widespread (Tonto National Forest 1996).

The greatest threat to Arizona hedgehog cactus are mining and related activities (USDI 1979). Within the Globe-Miami-Superior area, major mining operations in or adjacent to Arizona hedgehog cactus habitat are currently being conducted by Magma, Cyprus, and Carlota Copper. Other smaller mines and mining claims occur within and at the periphery of the range of the cactus. Although the surface geology of the habitat is not well mineralized, potential subsurface mineral deposits may warrant test drilling. In certain locations within occupied habitat, mining claims have been filed. Roads to provide exploration access and exploratory drilling for underlying deposits are a threat to the species even though these roads often detour around the prime Arizona hedgehog cactus habitat of rocky outcrops. The amount of potential disturbance from mining is dependent on whether a mine is open pit or shaft, and how much surface area (of occupied or potential habitat) will eventually be covered by tailings (USDI 1985). Cedar Creek Associates (1994) estimated that the Magma and Cyprus operations eliminated approximately 2,195 acres of potential habitat. There is no evidence, based on post-project surveys, that either plants or occupied habitat was directly lost to either of these mining operations.

Effects of the Action

As mentioned previously, two qualitatively different classes of actions are identified in the RMP/EIS: "Action Decisions" and plan-level guidance and direction, including actions described in the biological evaluation as "Policy/Guidance" and "Decisions Providing Management Direction." Both classes of actions will be addressed separately in this analysis.

Policy/guidance providing management direction in the RMP/EIS that have insignificant, beneficial, or no effect on Arizona hedgehog cactus are: special management areas; motor vehicle management; range management; cultural resource management; land classification; general environmental management; soil, water and air resource management; wildlife and special status species and riparian management; fire management; and wild and free-roaming burro management. Under special management areas; land tenure, and land use authorizations the biological evaluation identifies action decisions that could result in other impacts to the cactus. These include:

- Designate the White Canyon RCA covering 262,800 acres.
- Retain public lands (surface and subsurface estate) in seven RCAs.
- Consolidate public ownership and intensively manage lands in seven RCAs.
- Pursue acquisition of all State land in seven RCAs primarily through exchange.
- Consider acquisition of private lands in the seven RCAs on a case-by-case basis.
- Acquire through exchange non-Federal mineral estate underlying Federal surface holdings in the seven RCAs.
- Designate 391,803 acres of Federal surface outside the seven RCAs as suitable for disposal through State indemnity selection or State or private exchange.
- Designate 45,000 acres of Federal surface outside the seven RCAs as suitable for disposal through State indemnity selection or State or private exchange.
- Identify for disposal all subsurface mineral estate underlying Federal surface designated for disposal outside the seven RCAs, Cooperative Recreation Management Areas, and R&PPA lands.
- Land identified for disposal would generally be left open for communication site development on a case-by-case basis.
- Communication site applications will continue to be considered on land identified for disposal until such time as disposal takes place.
- Site specific environmental assessments will be prepared for actions approved in the RMP/EIS before the actions are implemented. The environmental analysis would be a site specific assessment of the impacts of implementing the actions.
- Environmental assessments will include biological evaluations and cultural clearances as part of the environmental analysis process and identify mitigation necessary to reduce the impacts of implementing an approved action.
- Actions that are not specifically identified in the approved RMP/EIS would be analyzed through an environmental assessment or an EIS in accordance with National Environmental Policy Act (NEPA) and the RMP/EIS amendment (1610.5-5) portion of the planning regulations (43 CFR 1600).
- Any land identified for disposal would be evaluated for significant cultural resources, threatened and endangered plants and animals, floodplain/flood hazards, and prime and unique farmlands before actual transfer of the land is completed.
- Wildlife and plants which are federally listed or proposed for listing as either threatened or endangered are protected under provisions of the Act.
- It is BLM policy to avoid jeopardizing the continued existence of any listed or proposed species and to actively promote species recovery.
- Potential impacts to wildlife and special status plants are analyzed in an environmental assessment for each project and protection measures may be stipulated in the decision record.

- Management of rangeland resources is guided by the Range Program Summary-Record of Decision (RPS/ROD) which selected the preferred alternative analyzed in the 1987 Eastern Arizona Grazing final EIS.

Designation of the White Canyon RCA and retention and consolidation of the surface and subsurface estates in public ownership should be beneficial to the species. Designation of lands and subsurface mineral estates for disposal could have adverse effects if the species occupies or could potentially occupy these lands. Development of communication sites could have an adverse effect if they are located on occupied or potential habitat. Development of environmental analyses or environmental impact statements with associated surveys for listed species and their habitat and consultation with the Service under section 7 of the Act for individual site specific projects, prior to implementation, would provide the opportunity to develop mitigation measures where needed. Grazing is not considered a major threat to the species, and grazing activities are not expected to affect the species significantly.

Cumulative Effects

Past mining, communication site development, and illegal plant collection have had adverse effects on this species and would be expected to continue on private and state lands.

Conclusion

After reviewing the status of the Arizona hedgehog cactus in the action area, the species' range-wide status, the effects of the proposed actions and the cumulative effects of other foreseeable actions on the species, it is the Service's biological opinion that the continuation of activities under the direction of the RMP/EIS is not likely to jeopardize the continued existence of the Arizona hedgehog cactus. The major threats to the species are collection and mining. The BLM has limited ability to control illegal collecting, and mining impacts are primarily on private lands.

Incidental Take

Sections 7(b)(4) and 7(o)(2) of the Act do not apply to the incidental take of listed plant species. See complete statement at end of this document in section called "Incidental Take Statement."

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The recommendations provided here relate only to the proposed action and do not necessarily represent fulfillment of the agency's section 7(a)(1) responsibility for Arizona hedgehog cactus. The following actions are recommended.

1. Continue to survey lands proposed for disposal that may contain individuals of Arizona hedgehog cactus to determine presence or absence prior to disposal.
2. Retain all areas containing Arizona hedgehog cactus in Federal ownership.
3. Where possible, avoid locating communication sites on Schultze granite, Dacite, or Pinal schist formations within the range of the species. If this is not possible, survey the site and salvage and transplant any individual cacti located prior to development of the site.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendation.

KEARNEY'S BLUE STAR (*Amsonia kearneyana*)

Status of the Species (Range-wide)

Kearney's blue star (Family *Apocynaceae*) is an herbaceous perennial with alternate lance-shaped leaves and erect, pubescent stems which rarely branch. The plant generally grows up to 2.3 feet tall and 3 feet across. Terminal flower clusters bloom a pale blue color in April and individual flowers range from 0.5 to 0.6 inches in length. Fruits are 1.2 to 3.9 inches long follicles commonly found in pairs extending beyond the leaves at the terminal ends of branches from June to July. Seeds are cork-like cylinders 0.3 to 0.4 inches long and approximately 0.014 inches wide with tapered ends (Phillips and Brian 1982). This taxon was listed as endangered by the Service in January of 1989 due its extreme vulnerability related to reduce population size and number (USFWS 1989).

Kearney's blue star is known only from the Baboquivari Mountains in Pima County, including South Canyon, and possibly one other canyon on the west slope, and Brown Canyon on the east slope. One group of plants in Brown Canyon consists of individuals planted from seed stock collected in South Canyon. In November 1993, 64 plants occurred in this introduced population (Reichenbacher et al. 1994). Another apparently natural group of approximately 300 plants occurs on a steep slope in upper Brown Canyon on Bureau lands upstream of the planted Kearney's blue stars (Thea Ulen, Buenos Aires National Wildlife Refuge pers. comm. 1997; Jim Donovan, University of Arizona pers. comm. 1997). The population in South Canyon consisted of 25 plants in 1982 (Phillips and Brian 1982) but was reduced to 8 individuals by 1986. Howell (1987) conducted surveys in most potential habitat in the Baboquivari Mountains without finding additional populations.

The species occupies alluvial bottoms and slopes of steep canyons composed of granitic parent material associated with partial cover and leaf litter of Mexican blue oak, *Quercus oblongifolia*; catclaw acacia, *Acacia greggii*; desert hackberry, *Celtis palida*; narrowleaf hoptree, *Ptelia angustifolia*; Arizona walnut, *Juglans major*; velvet mesquite, *Prosopis velutina*; lower growing desert honeysuckle, *Lonicera arizonica*; and desert cotton, *Gossypium thurberi*.

The presence of Kearney's blue star in riparian canyons, phenology of fruit maturity, and seed morphology, suggest that seed dispersal and germination are associated with summer monsoon rains and flood events.

Reintroduction of Kearney's blue star in Brown Canyon was only 26 percent successful, with no recruitment. Low success was due in part to flooding (Reichenbacher et al. 1994). Three transplantations occurred from 1989 and 1991. Once plants are established, survivorship increases (Reichenbacher et al. 1994). Research concluded that following transplantation of old and large greenhouse stock, plant survivorship and flowering could be successful in the absence of catastrophic flood events and with application of supplemental water and pesticides.

Heavy insect predation and increased flood events may threaten populations due to the extremely limited number of and small size of populations. Reproduction may be limited by stink bugs (*Chlorochroa ligulata*) feeding on seed embryos. The threat of a catastrophic flood has significance because some plants are located in canyon bottoms subject to periodic flooding. Increases in water flow through these steep canyons due to loss of upstream vegetation cover may reduce these populations and threaten the continued existence of this species. Activities that may cause significant losses in side slope and upstream cover, such as overgrazing or fire, may cause such a threat. Any threats to this species are very serious because of its extremely small range and population size.

Status of the Species (In the Action Area)

The only known occurrence of Kearney's blue star on BLM lands is the population in upper Brown Canyon in the Baboquivari allotment. The base property was recently purchased by the Service; this property is now part of Buenos Aires National Wildlife Refuge. Although the allotment has been placed into nonuse, approximately 6 to 12 cattle remain in upper Brown Canyon (Thea Ullen, pers. comm. 1997). The Federal permitted AUM is 240 for the Baboquivari allotment. Assuming all animals are adult, then current grazing is approximately 25 to 50 percent of permitted use. If calves are among the herd, current use would be somewhat less than that.

The upper Brown Canyon population, which consists of approximately 300 plants, is the largest population of Kearney blue star. Nearly all of the plants occur on a steep, northeasterly facing slope at about 5,000 feet in an upper fork of Brown Canyon. Two plants occur in the canyon bottom (Jim Donovan, pers. comm. 1997). Dominant plants include Mexican blue oak and Arizona rosewood (*Vaqueria californica*) on the hillsides, and poison ivy (*Rhus radicans*) and sycamore (*Platanus racemosa*) in the canyon bottom. Some evidence of grazing by cattle and/or deer in the form of trails in upper Brown Canyon in and near where the plants occur was noted by Jim Donovan (pers. comm. 1997).

The presence of most of the plants on a slope in the upper reaches of the canyon suggest that this population is probably much less susceptible to flooding events than plants in the canyon bottoms in the lower portion of Brown Canyon and in South Canyon. In the event of an extreme flood event, such as a late summer tropical storm, this population might remain relatively unaffected whereas plants in the bottom of Brown and South canyons could be scoured away.

Because of this, and because it is the largest of the three known populations of this endangered species, this population is critical to the survival of the species.

Effects of the Action

As mentioned previously, two qualitatively different classes of actions are identified in the RMP/EIS: "Action Decisions" and plan-level guidance and direction, including actions described in the biological evaluation as "Policy/Guidance" and "Decisions Providing Management Direction." Both classes of actions are considered in this analysis.

Under the proposed action in the RMP/EIS, decisions in the program areas of Rangeland Management and Fire Management have potential adverse affects on Kearney's blue star. Other program areas in the RMP/EIS have beneficial, insignificant, or no affect on this species.

The BLM's proposed action includes direction that provides for conservation measures to eliminate livestock grazing on the Baboquivari Allotment. They also work with other landowners in the Baboquivari Allotment to remove any remaining unauthorized livestock on the various combined properties and eliminate future unauthorized livestock use in the allotment. The new management direction also includes the provision that no livestock improvement projects (except facilities needed to exclude livestock on public lands), and no mechanical or chemical vegetation manipulation shall occur in the Brown Canyon Watershed within the Baboquivari Allotment for the purposes of managing livestock. Planning and management for prescribed fire and wildfire suppression in the watershed of Brown Canyon will be coordinated with the Service. With input from the Service, BLM shall develop a mitigation plan for each project. The mitigation plan must be agreed to and approved by both the Service and BLM. The BLM will monitor the status of the Brown Canyon Kearney's blue star population on their lands at least annually. Monitoring shall include looking for evidence of trespass cattle grazing in the vicinity of the population, and BLM shall briefly report to the Service the results of that monitoring in an annual report. The first report shall be due March 15, 1999.

Cumulative Effects

Cumulative effects are those adverse effects of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and are not considered cumulative to the proposed project. Effects of past Federal and private actions are considered in the environmental baseline.

Lands west of the crest of the Baboquivari Mountains are within lands of the Tohono O'odham Nation. Brown Canyon is a mix of BLM, State, and National Wildlife Refuge lands. Most of the east slope of the Baboquivari Mountains are owned by the Arizona State Lands Department, although BLM manages significant acreage near the crest of the mountain range. BLM lands in the Baboquivari allotment total 839 acres.

The status of the population in South Canyon is unknown, but the habitat there has been heavily grazed (Service 1993). No change in this situation is expected. State lands on the east slope are also grazed. Although State lands could be sold or used for other purposes to maximize revenues, demand for use of these lands for purposes other than grazing is probably low at present.

Actions that may affect populations in Brown Canyon would likely be Federal actions subject to consultation and are not considered as cumulative effects.

Conclusion

After reviewing the current status of Kearney's blue star, the environmental baseline for the action area, and the anticipated effects of the proposed grazing program, and cumulative effects, it is the Service's biological opinion that the continuation of activities under the direction of the RMP/EIS is not likely to jeopardize the continued existence of Kearney's blue star. The BLM's new management direction includes conservation measures for Kearney's blue star. This direction will allow for impacts that would have occurred under the direction of the RMP/EIS to be minimized. No critical habitat has been designated for Kearney's blue star.

Incidental Take

Sections 7(b)(4) and 7(o)(2) of the Act do not apply to the incidental take of listed plant species. See complete statement at end of this document in section called "Incidental Take Statement."

Conservation Recommendations

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for Kearney's blue star. In furtherance of the purposes of the Act, we recommend implementing the following actions:

1. The BLM should investigate the demographics of the population on their lands in Brown Canyon. Demographic information is used to determine minimum viable populations and acceptable levels of natural variation within stable, reproducing populations. This information can be used to clarify threats. Once identified, the BLM should implement measures to abate threats.
2. If suitable, unoccupied habitat is identified during BLM surveys for Kearney's blue star, they should assist the Service in developing and implementing plans to introduce the species into these habitats.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendation.

GILA TOPMINNOW (*Poeciliopsis occidentalis*)

Status of the Species (Range-wide)

The Gila topminnow (*Poeciliopsis occidentalis*) was listed as an endangered species on March 11, 1967, without critical habitat. The Gila topminnow is a small, live bearing fish found in the Gila, Sonora, and de la Concepcion River drainages in Arizona, New Mexico, and Sonora, Mexico (Minckley 1973, Vrijenhoek et. al. 1985). It was once among the commonest species of the Gila River and its tributaries (Hubbs and Miller 1941).

Destruction of its habitat through water diversion, stream downcutting, backwater draining, vegetation clearing, channelization, water impoundment, and other human uses of the natural resources and competition with and/or predation by nonnative fish species, most notably mosquitofish (*Gambusia affinis*), have resulted in extirpation of the Gila topminnow throughout most of its range (USDI 1984, Meffe et. al. 1983).

Gila topminnow and many other poeciliids can tolerate a wide variety of physical and chemical states. They are good colonizers in part because of this tolerance and in part because one gravid female can start a population (Meffe and Snelson 1989). Minckley (1969, 1973) described their habitat as edges of shallow aquatic habitats, especially where abundant aquatic vegetation exists.

Gila topminnows are known to occur in streams fluctuating from 6 to 37°C, pH from 6.6 to 8.9, dissolved oxygen levels of 2.2 to 11 milligrams/liter, and can tolerate salinities approaching those of seawater (Meffe et. al. 1983). Topminnows can burrow under mud or aquatic vegetation when water levels decline (Deacon and Minckley 1974, Meffe et al 1983). Sonoran topminnows regularly inhabit springheads with high loads of dissolved carbonates and low pH (Minckley et al 1977, Meffe 1983, Meffe and Snelson 1989). This factor has helped protect small populations of topminnows from mosquitofish that are usually rare or absent under these conditions.

Status of the Species (In the Action Area)

In the RMP/EIS resource area, the Gila topminnow occurs at two locations. One population occurs in Tule Creek on public land north of Lake Pleasant in the Lake Pleasant RCA, and one is located in AD Wash on State land also in the Lake Pleasant RCA. Both populations are introduced.

Gila topminnow occur on public land in Tule Creek on the Boulder Creek and Two Shoe allotments, and on State land in AD Wash on the 11 L allotment. This species was introduced widely in the 1970s and 1980s. Most of the introduced populations did not persist. These are two of the approximately 21 introduced populations that persist. Locations where this species once occurred but no longer exists include Cow Creek and Humbug Creek on the Two Shoe allotment (withdrawn from grazing) and Castle Creek on

the Bumble Bee allotment. The Tule Creek population was originally stocked in 1968 and supplementally stocked in 1981 following floods in 1978. The AD Wash population was stocked in 1993. Both stockings were made with mixed stock from Monkey-Cocio-Bylas by way of Boyce-Thompson Arboretum. The Tule Creek population underwent a significant population decrease following floods during January 1993. The population has recovered to the point where topminnow are common in permanent water throughout the area.

Most of the perennial reach of Tule Creek is fenced and was excluded from livestock grazing in 1991. Shortly after the fence was constructed, the water backed upstream and dried up below the exclosure. In 1991, a pipeline and drinker were installed to provide water for livestock outside the exclosure. During the following 2 years, the exclosure experienced repeated vandalism followed by maintenance. In 1993, floods scoured the channel taking out both the upper and lower water gaps. During the Summer of 1993, BLM rebuilt the water gaps, installed pipe rail fences, a swinging steel gate, and an interpretive sign. Since that time, vandalism has been minimal, and the exclosure has remained intact. The permanent water now persists further upstream and downstream than it did prior to fencing. Topminnow currently occur in dense concentrations throughout the stream within the exclosure, and downstream of the exclosure for approximately 0.25 miles to the road crossing. Since the upper 0.5 miles of the stream with permanent water was fenced, the stream has apparently recharged and flows up to approximately 0.5 miles further downstream than it did prior to fencing. The total additional flow length varies from year-to-year depending on the hydrologic regime. The 300 meters of occupied habitat below the exclosure did not exist prior to construction of the exclosure.

The AD Wash population appears to be stable (Kirk Young, AGED pers. comm.). The entire reach with permanent water is occupied by topminnow. The habitat occupied by topminnow in AD Wash is within a narrow canyon, inaccessible to livestock.

Introductions of topminnow were widespread during the late 1970s and early 1980s. Topminnow were introduced into Bench Well on the Prescott National Forest and washed downstream into Castle Creek on BLM administered lands. The fish persisted there for several years. The habitat in Castle Creek dried up in 1989. Recent surveys of Bench Well have not documented topminnow (Dave Weedman, AGED pers. comm.). Topminnow introduced into Cow Creek on private land washed downstream onto lands administered by BLM. The fish persisted for several years in Cow and Humbug Creeks but have not been collected in these streams following a scouring flood during the winter of 1992. BLM has sampled both streams extensively every year since the flood. Cow and Humbug Creeks are occupied by two species of exotic fish, green sunfish (*Lepomis cyanellus*) and fathead minnow (*Pimephales promelas*). Recent surveys of the original stocking location on Cow Creek have not documented topminnow (Dave Weedman, AGED pers. comm.). Topminnow are not yet considered extirpated from Castle Creek, Cow Creek, and Humbug Creek, but stocking efforts in these locations are considered unsuccessful. Potentially suitable reintroduction habitat for this species occurs in many areas of the RMP/EIS area within the historic range of the species.

Effects of the Action

As mentioned previously, two qualitatively different classes of actions are identified in the RMP/EIS: "Action Decisions" and plan-level guidance and direction, including actions described in the biological evaluation as "Policy/Guidance" and "Decisions Providing Management Direction." Both classes of actions will be addressed separately in this analysis.

Policy/guidance providing management direction in the RMP/EIS that have insignificant, beneficial, or no effect on the Gila topminnow are: land tenure; special management areas; motor vehicle management; land use authorizations; minerals management; cultural resource management; land classification; general environmental management; soil, water and air resource management; wildlife and special status species and riparian management; and fire management. Under the program areas of special management areas; land tenure; wildlife and special status species; land use authorization; motor vehicle management, minerals management; and wild and free-roaming burro management; the biological evaluation identifies some action decisions that could impact Gila topminnow. These include:

- Designate the Lake Pleasant RCA;
- Designate the Williams Mesa Multiple Resource Management Area (RMA);
- Develop an activity plan for the Williams Mesa Multiple RMA;
- Develop a herd management plan for the Lake Pleasant Burro Herd Management Area;
- Retain public lands in seven RCAs;
- Consolidate public ownership and intensively manages lands in seven RCAs;
- Pursue acquisition of all state lands in the seven RCAs;
- Consider acquisition of private lands in seven RCAs;
- Acquire non-federal mineral estate underlying federal surface holding in seven RCAs;
- Acquire State and private lands in the Lake Pleasant Burro Herd Management Area;
- Reintroduce native fish, including Gila topminnow and desert pupfish into all suitable sites on lands in Black Canyon and Lake Pleasant RCA;
- Prohibit land use authorizations in riparian areas in Williams Mesa RMA;
- Close 3.5 miles of Tule Creek to motorized vehicles, elsewhere in the Williams Mesa Multiple RMA, and limits motorized vehicles to existing roads and trails;
- Prohibit surface occupancy of oil/gas leases in riparian areas in the Williams Mesa Multiple RMA; and
- Designate Lake Pleasant Burro Herd Management Area.

Except for the designation of the Lake Pleasant Burro Herd Management Area, each of these are expected to result in beneficial or insignificant effects to the Gila topminnow and are not discussed further here. As a planning issue, grazing has the greatest potential for affecting the Gila topminnow in the Phoenix resource planning area. Livestock and burros cannot access the riparian habitat in AD Wash because of its topography; insignificant effects are expected. Burros use of Tule Creek area is light and most of the permanent water here were fenced in 1991. The riparian vegetation is continuing to improve with the livestock exclosures. However, grazing may adversely affect Gila topminnow, which currently occur in an approximately 300-meter stretch of Tule Creek downstream of the enclosure on the Boulder Creek allotment. Direct effects could include trampling of stream

banks and degradation of the habitat by congregating cattle. Livestock grazing occurs on many allotments that contain potential habitat that could be stocked with Gila topminnow as part of recovery efforts. Also, indirect adverse effects could result to the habitat from livestock grazing in upland areas around Tule Creek and the AD Wash watersheds by the loss of vegetation thus increasing runoff into the habitat. The BLM has cooperated in the attempts to reestablish the Gila topminnow and has fenced key habitat to protect it from grazing.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered here because they require separate consultation pursuant to section 7 of the Act.

Development of private lands, sale and development of State lands, livestock grazing, groundwater pumping, and exotic fish contamination of potential reintroduction sites are continuing threats to the species within the action area. Planning is in place to facilitate reintroduction efforts for the species into suitable habitat sites in the Black Canyon and Lake Pleasant RCA as described in the RMP/EIS.

Conclusion

After reviewing the current status of the Gila topminnow, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the continuation of activities under the direction of the RMP/EIS is not likely to jeopardize the continued existence of the Gila topminnow.

Incidental Take

The measures described below are nondiscretionary and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The BLM has a continuing responsibility to regulate the activity covered by this incidental take statement. If the BLM (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

The Service anticipates that renewed grazing activities will result in the incidental take of Gila topminnow from trampling through cattle occupying or crossing streams, or through changes in water quality and quantity (i.e., increased sedimentation). Incidental take of the Gila topminnow will be difficult to detect for the following reasons: dead fish are difficult to find, cause of death may be difficult to determine, and losses may be masked by seasonal fluctuations in numbers or other causes. Take will be considered exceeded if one or more of the following occur: (1) more than 10 dead Gila topminnow are found annually in the 300 meter stretch of Tule Creek below the enclosure when cattle are present; or (2) if headcuts originate in cattle use areas; or (3) if the grazed portion of Tule Creek is found

to be in unsatisfactory condition based on BLM criteria for classification of allotments. In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the Gila topminnow.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize the incidental take of Gila topminnow:

1. Maintain riparian enclosure of cattle from habitat in Tule Creek.
2. Monitor the fish community and habitat in Tule Creek including the enclosure and grazed riparian zones below the enclosure.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of Act, the BLM must comply with the following terms and conditions that implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

The following term and condition implements reasonable and prudent measure number 1:

- 1.1. The fences of the riparian enclosure shall be inspected and maintained at least twice annually when cattle are present.

The following term and condition implements reasonable and prudent measure number 2:

- 2.1 The BLM shall conduct fish habitat monitoring on Tule Creek every 3 years to determine habitat trends.
- 2.2. The grazed portions of occupied habitat in Tule Creek shall be monitored annually for habitat condition and to document any erosional features such as sloughed banks.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. With implementation of these measures, the Service believes that no more than ten individual Gila topminnow will be directly taken, that no headcuts will occur in cattle use areas, and that the riparian habitat in Tule Creek will remain in satisfactory condition. If, during the course of the action, this level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

- Vegetation utilization by livestock should be measured and monitored in the grazed portion of Tule Creek. Should problems arise, this information can be related to the condition of the watershed and riparian zones and could be used to identify potential causes and remedies.

LITTLE COLORADO RIVER SPINEDACE (*Lepidomeda vittata*)

Status of the Species (Range-Wide)

The Little Colorado River spinedace was listed as a threatened species with critical habitat on September 16, 1987. Critical habitat was designated in Arizona as: (Coconino County) East Clear Creek, approximately 18 miles of stream extending from the confluence with Leonard Creek upstream to the Blue Ridge Reservoir Dam, and approximately 13 miles of stream extending from the upper end of Blue Ridge Reservoir upstream to Potato Lake; (Navajo County) Chevelon Creek, approximately 8 miles of stream extending from the confluence with the Little Colorado River upstream to Bell Cow Canyon; and (Apache County) Nutriosa Creek, approximately 5 miles of stream extending from the Apache-Sitgreaves National Forest boundary upstream to the Nelson Reservoir Dam. At the time of listing, populations of the species were known from the East Clear Creek drainage, lower Chevelon Creek, Silver Creek, Nutrioso Creek, and portions of the Little Colorado River. Since that time, an additional population was located in Rudd Creek, a tributary to Nutrioso Creek. The recovery plan for the species was recently approved.

The spinedace is one of four species of the genus *Lepidomeda* in the tribe Plagopterini of the family Cyprinidae. One of these species is now extinct. The Plagopterini also contains two monotypic genera, *Meda* and *Plagopterus*. The Plagopterini are restricted to portions of Arizona, Nevada, New Mexico, and Utah (LaRivers 1962, Lee *et al.* 1980, Minckley 1973). Uyeno and Miller (1973) evaluated the karyotypes of the five remaining Plagopterini species and determined that *Meda* and *Plagopterus* are more closely related to each other than to the *Lepidomeda* species, and that the spinedace was more distinctly different from the other two *Lepidomeda* evaluated and probably arose earlier.

Mitochondrial DNA work on the spinedace was initiated in the 1990s and indicated the existence of three sub-groups identifiable by geographic area (Tibbitts *et al.* undated). The East Clear Creek drainage formed one sub-group, Chevelon Creek the second, and the upper Little Colorado including Nutrioso and Rudd Creeks formed the third. The study concluded that the genetic patterns seen were likely the result of populations being isolated and differentiated by stochastic events. The East Clear Creek and Chevelon Creek sub-groups were more individually distinctive, likely the result of a higher degree of isolation, and possess unique haplotypes. Individuals from the Little Colorado River sub-group are

more similar, and possibly, until very recently, there was one population with considerable gene flow before various dams and diversions increased local isolation. The cause or exact time of the isolation of the three sub-groups is not known (Tibbitts et al. undated).

The spinedace was first described in collections made in 1871-1874 from the Little Colorado River drainage by the Wheeler Survey and was formally described in 1874 by E.D. Cope (Miller and Hubbs 1960). It is a small fish; adult males and females are generally less than 100 millimeters in total length. There is little size differentiation between the sexes, although females may on average be longer than males. The back and upper sides are olivaceous, bluish, or lead grey with the venter being white and the sides silver with vertical black lines (Miller 1963).

The spawning period for spinedace is from May to June or July (Blinn 1993, Blinn and Runck 1990, Miller 1961, Minckley 1973, Minckley and Carufel 1967) although some females have been found to contain mature eggs as late as October (Minckley and Carufel 1967). Information from spinedace kept in a pond at the Flagstaff Arboretum indicate that adults there spawned three times in 1993 and 1994 (Blinn et al. 1994), but it is not certain if individual females spawn more than once.

Spawning occurred during the day in the stream that feeds into the Arboretum pond. Small schools (4 to 40 individuals) would leave the pond and move into the stream. Gravel substrates were utilized and sediments were cleared from spawning sites. No spawning was observed in pools containing fine sediments, or within areas with larger gravel and cobbles or aquatic vegetation. Water temperatures in the spawning areas averaged 21° centigrade (Blinn et al. 1994). Fry hatched about 5 days later after which they moved to the shallow areas of the pond, usually near floating algal mats or other aquatic vegetation (Blinn et al. 1994). Factors affecting spawning that were identified included changes to water levels, turbidity, photoperiod, and water temperature.

Young of the year spinedace reach half their adult size within 2 months. The average life expectancy, based on recapture information from the Arboretum pond, is 3 years (Blinn et al. 1994).

As with most aquatic habitats in the Southwest, the Little Colorado River basin contained a variety of aquatic habitat types and was prone to rather severe seasonal and yearly fluctuations in water quality and quantity. Both mountain streams and lower gradient streams and rivers have provided habitat for the spinedace. Residual pools and spring areas are important refuges during periods of normal low water or drought. From these refuges, spinedace are able to recolonize other stream reaches during wetter periods. This ability to quickly colonize an area has been noted in the literature (Minckley and Carufel 1967) as well as in observations by others familiar with the species. Populations seem to appear and disappear over short timeframes. This has made specific determinations on status and exact location of populations difficult. This tendency has been observed by both researchers and land managers (Miller 1963, Minckley 1965, Minckley 1973) and led to concerns in the 1960s and 1970s for the species survival.

As would be expected for a species adapted to fluctuating physical conditions, the spinedace is found in a variety of habitats (Blinn and Runck 1990, Miller 1963, Miller and Hubbs 1960, Nisselson and Blinn 1989). Whether occupancy of these habitats reflect the local preferences of the species or its ability to tolerate less than optimal conditions is not clear. Available information indicates that suitable habitat for the Little Colorado River spinedace is characterized by clear, flowing pools with slow to moderate currents, moderate depths and gravel substrates (Miller 1963, Minckley and Carufel 1967). Cover from undercut banks or large rocks is often a feature. Spinedace have also been found in pools and flowing water conditions over a variety of substrates, with or without aquatic vegetation, in turbid and clear water (Denova and Abarca 1992, Nisselson and Blinn 1991). Spinedace are mid-water dwellers. During high water events, adult spinedace will utilize the lower end of riffles and the upper ends of pools and are positioned lateral to the current (Minckley 1984). It is during these high water events that recolonization of other areas of the stream can occur.

Aquatic and terrestrial insects form the basis of the spinedace diet (Runck and Blinn 1993), but they will also consume algae and detritus (Blinn and Runck 1990, Minckley and Carufel 1967). Spinedace are opportunistic feeders, using whatever is seasonally available (Runck and Blinn 1993). Foraging may take place both in the water column and on the bottom (Minckley and Carufel 1967).

The native fish fauna of the Colorado River Basin is largely composed of endemic species. The Little Colorado River fish fauna is typical of basin fish faunas. Besides the spinedace, the speckled dace (*Rhinichthys osculus*), bluehead sucker (*Pantosteus discobolus*), Little Colorado River sucker (*Catostomus* sp.), roundtail chub (*Gila robusta*) and Apache trout (*Oncorhynchus apache*) were found in the mainstem and tributaries of the Colorado River Basin. In the last 100 years, at least 10 nonnative fish species have been introduced into spinedace habitats. These include rainbow trout (*Oncorhynchus mykiss*), fathead minnow (*Pimephales promelas*), and golden shiner (*Notemigonus crysoleucus*). Recent surveys in East Clear Creek have documented the presence of those three non-native species and brown trout (*Salmo trutta*) in the watershed (Denova and Abarca 1992). Data from research experiments and field observations indicate that at least the rainbow trout is a predator and potential competitor with the spinedace (Blinn *et al.* 1993). Data on interactions between other native or nonnative fish species and spinedace have not been obtained.

As mentioned previously, the populations of spinedace have a tendency to appear and disappear from locations within their range. These disappearances can be quite sudden, in as little as a few weeks, and last several years. In the 1960s and early 1970s, known populations were so few that the species appeared to be threatened with extinction (Miller 1964, Miller and Lowe 1964, Minckley 1965, Minckley 1973). Between the surveys of the early 1960s and those of the 1970s, the spinedace reappeared in most of the known range (Minckley and Carufel 1967) but populations declined in the late 1970s. In surveys from the early 1980s, five extant populations were identified (Minckley 1984) including two new locations in Nutrioso Creek. The Silver Creek population has not been collected in several years. Populations in East Clear Creek have declined since 1983 (Denova and Abarca 1992) although there were increased reports of occurrence in the drainage after the flooding in 1993.

The spinedace was listed as a threatened species with habitat alteration and destruction, predation and competition with nonnative aquatic organisms, and recreational fishery management actions largely responsible for the need to list the species. Land management activities in the range of the species have not changed significantly since the species was listed and there have been very few section 7 consultations with Federal agencies conducted for this species. State and private lands make up a considerable part of the habitat for this species outside the East Clear Creek drainage. No habitat conservation plan for the species has been proposed or is in development. The State of Arizona has acquired some private lands in the upper Little Colorado River drainage for wildlife purposes, and there are management possibilities on those lands that could benefit the spinedace. Arizona also owns a portion of the lands supporting the Chevelon Creek population. Since the spinedace was listed, the Rudd Creek population was discovered and the Silver Creek population may have been lost. A refugium population for Rudd Creek fish has been established at the Flagstaff Arboretum. No refugia populations for the other two genetic units exist. The recovery plan for the spinedace has been drafted but not yet finalized by the Service.

The status of the spinedace has not significantly improved since listing. The protections that could be afforded the species by Arizona's purchase of lands and water rights in the Rudd Creek area may result in some improvements to habitat that would benefit the species. The issue of competition and predation on spinedace by introduced trout species has been partially addressed in a biological opinion dealing with stocking of rainbow trout for recreational purposes.

While the result of that consultation may have effects that reduce the risk to spinedace from newly released trout, it does not address the resident trout populations.

It is very difficult to document the actual status of spinedace populations. The apparently inherent wide fluctuations in population size make it difficult to assess the health of each population and difficult to determine the effects of specific land management activities. The possible loss of the Silver Creek population is a significant event because it represented an isolated population and the newly discovered Rudd Creek population is part of the upper Little Colorado River complex. The Little Colorado-Nutriso Creek-Rudd Creek population appeared to be holding its own in 1993; however, increases in nonnative trout in some areas were noted. The Chevelon population had declined significantly by 1993 (AZGFD 1994) from much higher numbers in 1990-91 (AZGFD 1992). The East Clear Creek population had declined by 1993 (AZGFD 1994), but apparently increased with the flooding in 1993-94. Drought conditions in 1996 may reverse that gain and put additional stress on all known populations.

Status of the Species (In the Action Area)

The BLM manages isolated parcels of land along approximately 0.75 miles of Chevelon Creek approximately 20 miles upstream of its confluence with the Little Colorado River, 1.85 miles of Silver Creek near the confluence with the Little Colorado River, and 4.25 miles of the Little Colorado River in four pieces between St. Johns and Holbrook. The only BLM lands with habitat considered occupied by this species are along Silver Creek, although spinedace have not been collected from this area since 1965. Within the action

area, the Little Colorado River and Silver Creek are considered historic habitat. Seven grazing allotments contain potential habitat for the species. Surveys were conducted in Silver Creek between Snowflake and the confluence with the Little Colorado River, and along the Little Colorado River wherever water was found upstream to St. Johns by BLM and AZGFD personnel in 1990. No spinedace were collected from BLM lands during these survey efforts. Spinedace were collected in the Little Colorado River above the confluence with Nutrioso Creek.

Effects of the Action

As mentioned previously, two qualitatively different classes of actions are identified in the RMP/EIS: "Action Decisions" and plan-level guidance and direction, including actions described in the biological evaluation as "Policy/Guidance" and "Decisions Providing Management Direction." Both classes of actions are given consideration in this analysis.

Plan-level and Direction (policy/guidance and decisions providing management direction):

"Policy/guidance" identified in the biological evaluation represent actions that would have either beneficial, insignificant, or no effect on Little Colorado River spinedace include policy guidance for: general environmental management, prohibitions on land use authorizations; AEC designations; confinement of motorized vehicles to designated roads and trails, and prohibition of motorized vehicles in AEC and Cultural Resource Management or Riparian Areas; closure of mineral location land in AEC; prohibition of surface occupancy for oil and gas development inside AEC; implementation of habitat management plans in AEC; and designation of the Lake Pleasant Burro Herd Management Area. As discussed in the biological evaluation, "decisions providing management direction" that would have either beneficial, insignificant, or no effect on Little Colorado River spinedace include: Special Management Areas, Land Tenure decisions except for 3b (8-10), 3c (11-12); Minerals Management; Wildlife and Special Status Species; and Riparian Management.

The following is a discussion of the potential effects of the plan-level direction and guidance described in the biological evaluation. Effects of plan-level direction in the RMP/EIS are discussed by program area.

Land Tenure:

These plan-level (policy/guidance) decisions relate to the disposal of public lands. The disposal of public lands in the Phoenix Resource Area could have adverse effects to the spinedace if spinedace habitat was involved. In the RMP/EIS, any land identified for disposal must be evaluated for significant threatened and endangered species resources before transfer of land is completed. It is not specified whether unoccupied or potential habitat is to be considered in the evaluation of significance for endangered and threatened species.

Under land disposal, the "Decisions Providing Management Direction" 3b(8-10) allow for the disposal of 436,803 acres of public land that lie outside the seven RCA of the Phoenix Resource Area, and allows for the disposal of all subsurface mineral estate designated

outside the seven RCA, Cooperative Recreation Management Areas and Recreation and Public Purposes Act. The identification of most of the lands in Apache and Navajo Counties as suitable for disposal through exchange or sale, and the identification of most of the subsurface mineral estates in the area as suitable for disposal could lead to subsequent actions that may adversely affect the Little Colorado River spinedace. However, the potential for adverse effects from land disposal are somewhat tempered by overarching policy/guidance that provides for the preparation of environmental impact statements, environmental assessments, and/or biological evaluations for actions approved in the RMP/EIS prior to implementation. Also, policy/guidance requires an evaluation of significant threatened or endangered plants or animals on any land identified for disposal, and BLM is to avoid jeopardizing the continued existence of any listed or proposed species. Policy/guidance allows BLM to stipulate protection measures in a decision record of an environmental assessment prepared for a project.

Land Use Authorizations:

These decisions relate to the issuance of rights-of-ways, leases, permits, and easements within the resource area. Authorizations allowing utilization of areas adjacent to, or in, spinedace habitat could adversely impact the species.

Minerals Management:

This policy/guidance pertains to decisions on mineral withdrawals in AEC, overall and case-by-case guidance on minerals management, use permitting, use of lease agreements, exploration and development of locatable minerals, issuance of mineral leases, and mineral material sales. Minerals development in the vicinity of spinedace habitat could adversely affect water quality of the habitat of the species.

Soil, Water, Air Resource Management:

These policy/guidance decisions pertain to the BLM's management of air, soil, and water resources on the Phoenix resource area ensuring maintenance and enhancement of stream flows, water and air quality standards, maintenance and improvements to soil cover and productivity, and watershed improvement. In general, where these decisions affect the spinedace, they should benefit the species and its habitat.

Wildlife, Special Status Species and Riparian Management:

This policy/guidance involves decisions regarding the BLM's management of listed, proposed, and candidate species in compliance with the Act, in memoranda of understanding with the AZGFD, and in cooperation with the Arizona Commission of Agriculture. Where these decisions affect the spinedace, they are expected to be beneficial.

Fire Management:

Fire management policy/guidance relates to decisions about maintenance of full fire suppression in all areas and the need for special management plans to identify areas where prescribed burning would benefit wildlife, watershed, and rangeland resources. Decisions carried out under this policy that affect spinedace are expected to result in beneficial effects.

Range Management:

Grazing may adversely affect Little Colorado River spinedace. Direct effects of year-long grazing along streams can degrade riparian conditions. Cattle tend to congregate along streams during the summer. Cattle can trample the stream banks, altering the stream morphology, increasing sedimentation and degrading water quality. Objectives designed to improve riparian habitat conditions tend to temper these potential impacts. Livestock grazing of upland areas within the watershed of potential habitat may be contributing to the severity and frequency of flooding that alters the stream morphology, vegetative composition and turbidity, and sediment loading of the streams. These effects may also be continued downstream from the action area. However, objectives designed to improve watershed and riparian habitat conditions tend to temper these potential impacts. The authorization of livestock grazing on public lands within the potential habitat area influences to varying degrees livestock grazing on State and private lands in the area. If livestock grazing were not authorized by BLM on the allotments which potentially contain habitat for this species, trespass livestock grazing would continue to occur unless BLM fenced out all the public lands. Although spinedace have not been located on any of the allotments within the action area, populations existed in 1990 just north of St. Johns near Woodruff, and west of Zion Reservoir on the mainstem of the Little Colorado River.

Although critical habitat has been designated for this species, none exists on grazing allotments administered by BLM.

Action Decisions (Decisions that will result in action)

"Action Decisions" identified in the biological evaluation represent actions that would have beneficial, insignificant, or no effect on Little Colorado River spinedace include: prohibitions on land use authorizations; designation of AEC; closing AEC and Resource Areas to vehicles and limiting vehicles to designated roads and trails in AEC and Resource Areas; prohibitions on surface occupancy for oil/gas development in AEC and in wildlife Management Areas; implementation or continuance of Habitat Management Plans in Waterman AEC and in the Tanner Wash Area; and designation of Lake Pleasant Burro Herd Management Area.

Cumulative Effects

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future

Federal actions that are unrelated to the proposed action are not considered here because they require separate consultation pursuant to section 7 of the Act.

Given the mixed nature of land ownership in the Phoenix resource planning area, cumulative effects would include those from grazing, recreation facilities, water developments by private interests, and urban and agricultural development. Adverse impacts associated with groundwater pumping, water diversion, exotic species and livestock grazing continue on all of the lands in the area. The majority of the land ownership in the area is private or State.

Conclusion

After reviewing the status of the Little Colorado River spinedace in the action area, the species' range-wide status, the effects of the proposed action, and the cumulative effects on the species, it is the Service's biological opinion that the continuation of activities under the direction of the RMP/EIS is not likely to jeopardize the continued existence of the Little Colorado River spinedace or result in the destruction or adverse modification of the species' critical habitat. Although grazing activities impact potential or historical habitat, there are no confirmed populations within the small portion of the species range within the area under the RMP/EIS direction.

Incidental Take

Although grazing allotments contain potential habitat for Little Colorado River spinedace, no spinedace have been located on any of the allotments within the action area. The Service does not anticipate that the proposed action will result in the incidental take of any Little Colorado River spinedace.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

- The BLM should identify factors that limit recovery potential of spinedace on lands under their jurisdiction and work to correct them.

CACTUS FERRUGINOUS PYGMY-OWL (*Glaucidium brasilianum cactorum*)

Status of the Species (Range-Wide)

A complete list of references used in the development of the following section may be obtained from the AESFO and is a part of the administrative record for this consultation.

The Service included the cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*) on its Animal Notice of Review as a category 2 candidate species throughout its range on January 6, 1989 (54 FR 554). After soliciting and reviewing additional information, the Service elevated the species to category 1 status throughout its range on November 21, 1991 (56 FR 58804). A category 1 species is defined as a species for which the Service has on file substantial information to support listing, but for which a proposal to list has not been issued as it is precluded at present by other listing activities. The Service no longer uses these categories but instead maintains one candidate list (61 FR 64481, December 5, 1996).

On May 26, 1992, a coalition of conservation organizations petitioned the Service, requesting listing of the pygmy-owl as an endangered subspecies under the Act. The petitioners also requested designation of critical habitat. In accordance with section 4(b)(3)(A) of the Act, on March 9, 1993, the Service published a finding that the petition presented substantial scientific or commercial information indicating that listing may be warranted, and initiated a status review on the pygmy-owl (58 FR 13045).

In conducting its status review, the Service solicited additional comments and biological data on the status of the cactus ferruginous pygmy-owl through mailings, a notice in the Federal Register (58 FR 13045), and other means.

On December 12, 1994, the Service published a 12-month finding on the petitioned action (59 FR 63975). This finding indicated that listing of the cactus ferruginous pygmy-owl was warranted. A proposed rule was published on the same date to list the pygmy-owl as endangered in Arizona with critical habitat and as threatened in Texas without critical habitat. New information was received during comment periods indicating that population levels are higher in Arizona and Texas than was known at the time of the proposed rule. The Service determined that the Arizona population still warranted endangered status. Conversely, the new information indicated that listing the species as threatened in Texas was not warranted. Listing was finalized on March 10, 1997 and was effective on April 9, 1997. Critical habitat, including 290 river miles in Arizona, was included in the proposed listing, but was determined to be not prudent in the final rule.

The cactus ferruginous pygmy-owl (Order Strigiformes--Family Strigidae) is a small bird, approximately 17 centimeters (6 3/4 inches). Males average 62 grams (2.2 ounces), and females average 75 grams (2.6 ounces). The cactus ferruginous pygmy-owl is reddish-brown overall with a cream-colored belly streaked with reddish-brown. Some individuals are grayish rather than reddish-brown. The crown is lightly streaked, and paired black-and-white spots on the nape suggest eyes. There are no ear tufts, and the eyes are yellow. The tail is relatively long for an owl and is colored reddish-brown with darker brown bars. The call of this diurnal owl, heard primarily near dawn and dusk, is a monotonous series of short notes.

The cactus ferruginous pygmy-owl is one of four subspecies of the ferruginous pygmy-owl. It occurs from lowland central Arizona south through western Mexico, to the States of Colima and Michoacan, and from southern Texas south through the Mexican States of Tamaulipas and Nuevo Leon. The northern most record for the pygmy-owl is from

New River, Arizona, approximately 55 kilometers (35 miles) north of Phoenix. South of these regions and through Central America, *G. b. ridgwayi* replaces *G. b. cactorum*. Throughout South America, *G. b. brasilianum* is the resident subspecies. Also, a fourth subspecies of pygmy-owl (*G. b. stranecki*) has been identified from central Argentina.

The cactus ferruginous pygmy-owl was described in 1937, based on specimens from Arizona and Sonora. It is distinguished from *G. b. ridgwayi* and *G. b. brasilianum* by its shorter wings and longer tail, and by generally lighter coloration. *G. b. cactorum* occurs in several color phases, with distinct differences between regional populations. Some investigators have suggested that further taxonomic investigation is needed, primarily to determine whether the current *G. b. cactorum* comprises more than one subspecies.

G. b. cactorum is widely recognized as a valid subspecies. The American Ornithologists' Union (AOU) recognized *G. b. cactorum* in its 1957 *Checklist of North American Birds*, but subsequent AOU lists did not address subspecies.

The cactus ferruginous pygmy-owl nests in a cavity of a tree or large columnar cactus. Cavities may be naturally formed; e.g., knotholes, or excavated by woodpeckers. No nest lining material is used. The cactus ferruginous pygmy-owl has also nested in fabricated nest boxes. Three, four, five, and occasionally six eggs are laid. They are incubated for approximately 28 days. The young fledge about 28 days after hatching. The cactus ferruginous pygmy-owl begins nesting activities in late winter to early spring.

The cactus ferruginous pygmy-owl occurs in a variety of subtropical, scrub, and woodland communities, including river bottom woodlands, woody thickets ("bosques"), coastal plain oak associations, thornscrub, and desertscrub. Unifying habitat characteristics among these communities are fairly dense woody thickets or woodlands, with trees and/or cacti large enough to provide nesting cavities. Throughout its range, the cactus ferruginous pygmy-owl occurs at low elevations, generally below 1,200 meters (4,000 feet). In the western portion of its range, the cactus ferruginous pygmy-owl appears to use riparian woodlands and bosques dominated by mesquite and cottonwood, Sonoran desertscrub (usually with relatively dense saguaro cactus forests), and Sinaloan deciduous forest. The pygmy-owl also has been found in thickets of intermixed mesquite and saguaro cactus near the New River, Arizona. Prior to the mid-1900's, the cactus ferruginous pygmy-owl was also described as not "uncommon", "of common occurrence," and "fairly numerous" resident of lowland central and southern Arizona in cottonwood forests, mesquite-cottonwood woodlands, and mesquite bosques along the Gila, Salt, Verde, San Pedro, and Santa Cruz rivers, and various tributaries. Several birds have been taken along Rillito Creek near Fort Lowell, in the vicinity of Tucson, Arizona. The cactus ferruginous pygmy-owl also occurs in Sonoran desertscrub associations in southern and southwestern Arizona, comprised of palo verde, ironwood, mesquite, acacia, bursage, and columnar cacti such as the saguaro and organpipe.

In the past, the cactus ferruginous pygmy-owl's occurrence in Sonoran desertscrub was apparently less common and predictable. It was more predictably found in xeroriparian habitats (very dense desertscrub thickets bordering dry desert washes) than more open,

desert uplands. The cactus ferruginous pygmy-owl also has been noted to occur at isolated desert oases supporting small pockets of riparian and xeroriparian vegetation.

Both riparian and desertscrub habitats are likely to provide several requirements of the cactus ferruginous pygmy-owl ecology. Trees and large cacti provide cavities for nesting and roosting. Also, these habitats along watercourses are known for their high density and diversity of animal species that constitute the cactus ferruginous pygmy-owl's prey base. In addition, the dense vegetation along these washes provides protective cover from aerial predators.

Since the cactus ferruginous pygmy-owl was recently listed, only a few consultations have been completed or are underway for this species. Loss and modification of nesting habitat as one of the primary threats to this species, especially on private land. The extent of this loss may be reflected in the extremely low population size of this bird in Arizona. It is estimated that between 85 to 90 percent of low-elevation riparian habitats in the southwestern U.S. have been modified or lost.

These alterations and losses are attributed to urban and agricultural encroachment, wood cutting, water diversion and impoundment, channelization, livestock overgrazing, groundwater pumping, and hydrologic changes resulting from various land-use practices.

Fewer than 20 verified records of cactus ferruginous pygmy-owls in Arizona for the period of 1971 to 1988. In 1992, surveys located three single cactus ferruginous pygmy-owls in Arizona. More extensive surveys in 1993 again located three single cactus ferruginous pygmy-owls in Arizona. During 1993 - 1994 surveys, one pair of cactus ferruginous pygmy-owls was detected in north Tucson, near the sightings of 1992 and 1993. Two individual owls were found in northwest Tucson during 1995 surveys, and an additional owl was detected at Organ Pipe Cactus National Monument. In 1996, the AZGFD focused survey efforts in northwest Tucson and Manana, and detected a total of 17 birds. Total individuals in Arizona are still extremely low at 19, with most of the birds occurring on private land. Results of the 1997 survey season indicate 12 cactus ferruginous pygmy-owls statewide.

Status of the Species (In the Action Area)

The south central and the southern parts of the north central portion of the RMP/EIS area are entirely within the historical range of the cactus ferruginous pygmy-owl. Historical and recent sightings have occurred within this area, particularly around Tucson. Potential habitat occurs throughout the RMP/EIS planning area. The AZGFD began conducting intensive surveys in 1993 in the historic range of the cactus ferruginous pygmy-owl. The areas that were surveyed were: the lower San Pedro River from Cascabel to Winkelman; northwest Tucson, between Oracle Highway and the Tortolita Mountains; east Tucson, from Sabino Canyon to Tanque Verde Wash and the lower elevations of the Saguaro National Monument; Rincon Creek from X-9 Ranch to Thunderhead Ranch; and the confluence of the Verde and Salt Rivers. Only one individual was heard in the northwest Tucson area.

The surveys have continued, and nine separate sightings have been made in the northwest Tucson area in Sonoran desertscrub associations of paloverde, ironwood, mesquite, and saquaro. These sightings include one pair and four successfully fledged young.

Effects of the Action

The two qualitatively different classes of actions identified in the RMP/EIS are considered in this analysis. These include "Action Decisions" and plan-level guidance and direction, including actions described in the biological evaluation as "Policy/Guidance" and "Decisions Providing Management Direction."

Some RMP/EIS decisions have insignificant or no effects on cactus ferruginous pygmy-owls and will not be discussed further in this biological opinion. These decisions are within the Wilderness Management, Wildlife and Special Status Plant Resource Management, Cultural Resource Management, and Hazardous Material Management program areas. Some decisions direct further planning and therefore defer specific direction. The effects of direction in each program area are as follows:

Land Use Management:

Land use management actions that may affect the cactus ferruginous pygmy-owl include land exchanges, right-of-way designations, or other unspecified land use authorizations. Individual land acquisitions could have an insignificant to no effect or may benefit the cactus ferruginous pygmy-owl. Some lands are designated for disposal for recreational development. These actions may adversely affect the cactus ferruginous pygmy-owl through interdependent recreational development actions. Direction is offered through the RMP/EIS for land exchanges by giving priority to acquisition of lands within the AEC and other management areas. The new direction requires survey and mapping of habitat, which should prevent inadvertent disposal or exchange of habitat important to the cactus ferruginous pygmy-owl.

Designations of AEC could have beneficial to no effect on the cactus ferruginous pygmy-owl. Designation of special management areas alone would not affect the cactus ferruginous pygmy-owl, but activities and actions authorized by that designation may affect that species. No specific guidance is given by the RMP/EIS for protection for listed species or their habitats within the special management areas.

Prohibition of land use designations in certain areas may be beneficial to cactus ferruginous pygmy-owls. Designation of right-of-ways are directed to maximum utilization of existing right-of-ways, which would minimize potential impacts to cactus ferruginous pygmy-owls. Designation of seven utility corridors in Black Canyon, Silver Bell, and White Canyon RCAs could result in losses of cactus ferruginous pygmy-owl habitat and/or directly affect cactus ferruginous pygmy-owls. Habitat and cactus ferruginous pygmy-owls on lands designated for disposal may be further impacted by leaving them open for communication or utility development. However, the new direction would ensure that essential habitat features for cactus ferruginous pygmy-owl are maintained if development occurs.

Closure or limitation of vehicles to designated roads and trails within AEC would benefit the cactus ferruginous pygmy-owl by decreasing or eliminating degradation of habitat or direct impacts to individuals. However, there is no specific guidance regarding vehicle use and road construction in areas without closures and limitations. Off-highway vehicle (OHV) use can affect cactus ferruginous pygmy-owls by destroying vegetation and harassing owls. New road construction may also destroy and/or fragment cactus ferruginous pygmy-owl habitat and disturb cactus ferruginous pygmy-owls. Management actions directing road closures and restriction of vehicular activity may minimize and/or avoid these effects. These closures and limitations do not apply to all of the resource planning area nor do they specify these actions for protection of cactus ferruginous pygmy-owls and their habitat. However, the new direction to map and survey for individuals and their habitat and modify activities to protect owls and their habitat should avoid and or minimize impacts.

Minerals Management:

Specific mineral withdrawals and lease prohibitions may benefit the species. However, the rest of the resource planning area under the direction of the RMP/EIS is to remain open to leasing, exploration, and development with no specific provisions for pygmy-owl protection. Mapping and survey under the new direction will enable the identification and protection of important habitat features for the species.

Rangeland Management:

Management for grazing is "guided by the Range Program Summary - Record of Decision" for the Eastern Arizona Grazing EIS. Grazing prohibitions would have a beneficial to no effect since they would either eliminate or prevent degradation of habitat by livestock. Direction for range improvement may also benefit the species. However, the remaining grazing can potentially affect the cactus ferruginous pygmy-owl by degrading habitat. Livestock can degrade riparian and other habitats through trampling and browsing on young trees, trampling stream banks thereby increasing erosion and scouring of vegetation, and removing nurse tree cover for cactus development. The removal of annuals and shrubs by grazing activities may reduce prey abundance for the cactus ferruginous pygmy-owl. The Eastern Arizona Grazing EIS gives direction for riparian habitat protection and improvement but there are no specific decisions for protection or habitat improvement for the cactus ferruginous pygmy-owl. Requirements under the new direction to maintain essential habitat features for the cactus ferruginous pygmy-owl should prevent serious degradation from these sources.

Wild, Free-roaming Burros:

Maintenance of a burro population in the Lake Pleasant may result in the degradation of owl habitat, without specific measures regarding burro grazing in habitat. Burro grazing would have the same potential effects as livestock grazing (see analysis under Rangeland Management), but is subject to the same measures that will identify and protect essential habitat features.

Soil, Water, and Air Resources:

Stream flows are to be maintained in special management areas. This would help maintain cactus ferruginous pygmy-owl riparian habitat. Possible modification of stream flow could reduce the quantity and quality of riparian habitat. Development within floodplains may result in the loss of cactus ferruginous pygmy-owl riparian habitat and direct impacts to any cactus ferruginous pygmy-owls occupying that habitat. Direction in this program area, and the new management direction, should together protect cactus ferruginous pygmy-owl habitat from floodplain development.

Fire Management:

Fire suppression may be beneficial in the protection of cactus ferruginous pygmy-owls from fires. Some fire suppression activities, however, may result in the loss of habitat; e.g. bulldozer lines. Prescribed burning may reduce catastrophic fire risk, although cactus ferruginous pygmy-owl habitat types are not fire adapted and are slow to recover. Fires, prescribed or otherwise, would adversely affect the cactus ferruginous pygmy owl through loss of habitat and potential loss of individuals.

Recreation Management:

Recreation such as campground and trail development and use, hunting, hiking, or water play may impact the cactus ferruginous pygmy-owl. Off-road vehicle use (ORV), except where specifically prohibited, may also impact cactus ferruginous pygmy-owls. These actions can destroy and degrade habitat, including nest trees, as well as harass individual cactus ferruginous pygmy-owls. The Service expects that BLM will use the new conservation measures for survey to immediately identify areas where ORV use should be lessened or prohibited. Woodcutting also can impact owls by eliminating nurse trees necessary for cactus development. The new direction to maintain essential habitat features is expected to protect habitat from these activities.

Cumulative Effects

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Given the scattered pattern of BLM lands and proximity to many holdings to developing areas, the Service anticipates that the cumulative effects that may impact the cactus ferruginous pygmy-owls and their habitat include livestock grazing; urban, rural, and agricultural development; water diversions.

Conclusion

The Service believes that inadequate protection of the cactus ferruginous pygmy-owl would compromise the likelihood of survival and recovery of this animal in consideration of the lack of knowledge regarding the species specific ecological requirements and the extreme rarity of the cactus ferruginous pygmy-owl in Arizona. The Phoenix resource planning area contains suitable and occupied habitat, and most currently known localities are within or in the vicinity of the resource area. The BLM lands are crucial for the survival and recovery of

this species in Arizona. Lack of information on the distribution of cactus ferruginous pygmy-owls and status of potential habitat within the RMP/EIS resource planning area hinders the identification of actions that would protect the cactus ferruginous pygmy-owl from further decline. The direction in the RMP/EIS alone is not specific enough to ensure that project designs and management decisions would not seriously impact the cactus ferruginous pygmy-owl. However, the new management direction in the form of conservation measures provide direction that adequately ensures plan-level protection for the cactus ferruginous pygmy-owl.

After reviewing the current status of the cactus ferruginous pygmy-owl, the environmental baseline for the action area, the effects of the proposed action, and available information on cumulative effects, it is the Service's biological opinion that continuation of activities under the direction of the RMP/EIS, supplemented with the new conservation measures, is not likely to jeopardize the continued existence of the cactus ferruginous pygmy-owl. Because critical habitat has not been designated, the proposed action is not likely to destroy or adversely modify critical habitat.

Incidental Take

With the BLM's implementation of the conservation measures to provide management direction for the cactus ferruginous pygmy-owl in the Phoenix resource planning area, the Service does not anticipate that the proposed action will take any cactus ferruginous pygmy-owls. See also following section of this document regarding "Incidental Take Statement."

Conservation Recommendations

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for cactus ferruginous pygmy-owl. In furtherance of the purposes of the Act, we recommend implementing the following actions:

1. The BLM should coordinate with the Service on the development of emergency protocols for response actions that occur within cactus ferruginous pygmy-owl habitat, or may otherwise affect the cactus ferruginous pygmy-owl on the BLM lands, to develop possibilities for the minimization of impacts to and/or protection for the cactus ferruginous pygmy-owl.
2. The BLM should consider adding specific habitat protection guidance based on the conservation measures as amendment to the RMP/EIS when it is next amended, or in any future, comparable document that covers the planning area.

3. The BLM should consider providing AEC status to cactus ferruginous pygmy-owl habitat in the next planning cycle for the Phoenix Resource Area.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendation.

SOUTHWESTERN WILLOW FLYCATCHER (*Empidonax traillii extimus*)

Status of Species (Range-Wide)

The southwestern willow flycatcher was proposed for listing as endangered, with critical habitat, on July 23, 1993. A final rule listing the species as endangered was published on February 27, 1995. The designation of critical habitat was published on July 22, 1997. The following information is developed from a compilation of published and unpublished data.

The southwestern willow flycatcher is a small passerine bird. It is a neotropical migratory species that breeds in the southwestern United States and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season. The historical range of the southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja California).

Life History

The southwestern willow flycatcher is a small riparian obligate bird, nesting along rivers, streams, and other wetlands where dense growths of willow (*Salix* sp.), *Baccharis*, buttonbush (*Cephalanthus* sp.), boxelder (*Acer negundo*), saltcedar (*Tamarix* sp.) or other plants are present, often with a scattered overstory of cottonwood (*Populus* sp.) and/or willow. The species is an insectivore, foraging within and above dense riparian vegetation, taking insects on the wing, or gleaning them from foliage.

Birds begin arriving on breeding grounds in late April and May. Migration routes are not completely known. However, willow flycatchers have been documented migrating through specific locations and drainages in Arizona that do not currently support breeding populations, including the upper San Pedro River, Colorado River through Grand Canyon National Park, lower Colorado River, Verde River tributaries, and Cienega Creek. These observations probably include subspecies *E.t. brewsteri* and *E.t. adastus*. *Empidonax* willow flycatchers rarely sing during fall migration, so that a means of distinguishing some migrating *Empidonax* without a specimen is not feasible. However, willow flycatchers have been reported to sing and defend winter territories in Mexico and Central America.

Southwestern willow flycatchers begin nesting in late May and early June and fledge young from late June through mid-August. Southwestern willow flycatchers typically lay three to four eggs in a clutch (range = 2-5). The breeding cycle, from laying of the first egg to fledging, is approximately 28 days. Eggs are laid at one-day intervals; they are incubated

by the female for approximately 12 days; and young fledge approximately 12 to 13 days after hatching. Willow flycatchers typically raise one brood per year but have been documented raising two broods during one season. Southwestern willow flycatchers have also been documented renesting after nest failure.

Survivorship of adults and young have been reported as: of 58 nestlings banded since 1993, 21 (36 percent) returned to breed; of 57 birds banded as adults (after hatch year) since 1989, 18 (31 percent) returned to breed at least 1 year (10 males, 8 females), 5 (9 percent) returned to breed for 2 years (all males), and 2 (3.5 percent) returned to breed for 3 years. A statistically significant variation in return rates of juveniles also has been documented as a function of fledging date; approximately 21.9 percent of juveniles fledged on or before July 20 returned the following year, whereas only 6.4 percent of juveniles fledged after July 20 returned the following year.

Range-wide, occupied habitat for the southwestern willow flycatcher can be characterized by dense patches of riparian shrubs or trees including stands of native vegetation and occasionally exotic vegetation. The size and shape of occupied riparian habitat patches vary considerably. Southwestern willow flycatchers have been found nesting in patches as small as 0.8 hectares; e.g., Grand Canyon, and as large as several hundred hectares; e.g., Roosevelt Lake and Lake Mead. When viewed from above, mixed vegetation types often appear as a mosaic of plant species and patch shapes and sizes. In contrast, narrow, linear riparian habitats one or two trees wide do not appear to contain attributes attractive to nesting willow flycatchers. However, willow flycatchers have been found using these habitats during migration.

Open water, cienegas, marshy seeps, or saturated soil are typically in the vicinity of willow flycatcher nests. Willow flycatchers have been documented nesting in areas where nesting substrates were in standing water. At some locations, particularly during drier years, water or saturated soil is only present early in the breeding season; i.e., May and part of June. However, the total absence of water or visibly saturated soil has been documented at sites where the river channel has been modified; e.g., creation of pilot channels, where modification of subsurface flows has occurred; e.g., agricultural runoff, or as a result of natural changes in river channel configuration.

Southwestern willow flycatcher nests are typically placed in the fork of a branch with the nest cup supported by several small-diameter vertical stems. The main branch from which the fork originates may be oriented vertically, horizontally, or at an angle. Stem diameter for the main supporting branch can be as small as 3 to 4 centimeters. Vertical stems supporting the nest cup are typically 1 to 2 centimeters in diameter. Occasionally, willow flycatchers place their nests at the juncture of stems from separate plants, sometimes different plant species. Those nests are also characterized by vertically-oriented stems supporting the nest cup. Nest height relative to the base of nest substrate also varies across the willow flycatcher's range.

Willow flycatchers using predominantly native broadleaf riparian habitats nest relatively low to the ground (between 1.8 meters and 2.1 meters on average), whereas those using mixed native/exotic and monotypic exotic riparian habitats nest relatively high above the ground (between 4.3 meters and 7.4 meters on average). Historic egg/nest collections and species' descriptions from throughout the willow flycatcher's range confirm the bird's widespread use of willow for nesting.

Population Dynamics

Intensive nest monitoring efforts in California, Arizona, and New Mexico have revealed that: (1) Sites with both relatively large and small numbers of pairs have experienced extremely high rates of brood parasitism; (2) high levels of cowbird parasitism in combination with nest loss due to predation have resulted in low reproductive success and, in some cases, population declines; (3) at some sites, levels of cowbird parasitism remain high across years, while at others parasitism varies temporally with cowbirds absent in some years; (4) the probability of a willow flycatcher successfully fledging its own young from a nest that has been parasitized by cowbirds is low (i.e., < 5 percent); (5) cowbird parasitism and nest loss due to predation often result in reduced fecundity in subsequent nesting attempts, delayed fledging, and reduced survivorship of late-fledged young; and (6) nest loss due to predation appears more constant from year to year and across sites, generally in the range of 30 to 50 percent.

Besides lowering nest success, fecundity, and the number of young produced, cowbird parasitism may also lower survivorship of young fledged late in the season. Southwestern willow flycatchers that abandon parasitized nests, or reneest after fledging cowbirds, lay fewer eggs in subsequent clutches and, if successful, fledge young late in the season. Cowbird parasitism has been shown to delay successful willow flycatcher nesting by at least 13 days. This delay resulted in significantly different return rates of juveniles. Only 6.4 percent of young that came from late nests were recaptured in subsequent years. However, 21.9 percent of young that came from early nests were recaptured. If these recapture rates mirror actual survivorship, then even though some parasitized willow flycatchers eventually fledge their own young, nest loss due to parasitism or depredation may have the more insidious effect of reducing overall juvenile survivorship.

Cowbird parasitism and nest depredation are adversely affecting willow flycatchers throughout their range. Cowbirds have been documented at more than 90 percent of sites surveyed. Parasitism rates have been highly variable, at the same sites, from one year to the next. Thus, the potential for cowbirds to be a persistent and widespread threat remains high.

Status and Distribution

E.t. extimus was first described from a specimen collected by Gale Monson on the lower San Pedro River near Feldman, Arizona. The taxonomic validity of *E.t. extimus* was subsequently reviewed and has been accepted by most authors. Historical and contemporary records of *E.t. extimus* have been reviewed throughout its range, revealing that the species has "declined precipitously . . ." and that "although the data reveal no

trend in the past few years, the population is clearly much smaller now than 50 years ago, and no change in the factors responsible for the decline seem likely."

The loss of more than 70 breeding locations range wide has been documented, including locations along the periphery and within core drainages that form this subspecies' range. Range-wide estimates of the willow flycatcher population were found to be comprised of 500 to 1,000 pairs. Since 1992, more than 800 historic and new locations have been surveyed range wide to document the status of the willow flycatcher (some sites in southern California have been surveyed since the late 1980s). Survey efforts in most states were done under the auspices of the Partners In Flight program, which served as the coordinating body for survey training sessions and review and synthesis of data. The extensive and, in some cases, intensive nature of these efforts have provided a critical baseline for the current distribution, abundance, and reproductive success of willow flycatchers range wide.

Range wide, the current known population of willow flycatchers stands at 454 territories. This indicates a critical population status; more than 75 percent of the locations where willow flycatchers have been found are composed of five or fewer territorial birds. Up to 20 percent of the locations are comprised of single, unmated individuals. The distribution of breeding groups is highly fragmented with groups often separated by considerable distances; e.g., approximately 88 kilometers straight-line distance between breeding willow flycatchers at Roosevelt Lake, Gila County, Arizona, and the next closest breeding groups known on either the San Pedro River (Pinal County) or Verde River (Yavapai County). Additional survey effort, particularly in southern California, may discover additional small breeding groups. However, range-wide survey efforts have yielded positive results in less than 10 percent of surveyed locations. Moreover, survey results reveal a consistent pattern range-wide: the willow flycatcher population as a whole is comprised of extremely small, widely-separated breeding groups or unmated willow flycatchers.

In determining the current range-wide status, the Service has given consideration to impacts on willow flycatcher and its habitat from the Bureau of Reclamation's (BR) operations and maintenance of the Lower Colorado River, as well as the agency's proposed modified operations at Roosevelt Dam. Also given consideration are the Corp of Engineer's long-range operations of the Lake Isabella Reservoir. Each of these actions have undergone, or are now undergoing, section 7 consultation.

Status of the Species (In the Action Area)

The biological evaluation indicates that all riparian habitats along all of the streams in the Phoenix Resource Area have been evaluated to determine habitat potential for willow flycatchers. Willow flycatcher surveys were conducted in 1993 and 1995 along portions of the Agua Fria River, tributaries of the Agua Fria River including Dry Creek, Little Ash Creek, Sycamore Creek, Indian Creek, Silver Creek, Cow Creek, Humbug Creek and Tule Creek; the Hassayampa River and the Gila River.

The areas considered potential habitat in the planning area include all of the Gila River, portions of Silver Creek (a tributary of the Little Colorado River) and portions of the Little Colorado River. Willow flycatchers were recorded along the lower 21.5 miles of the Gila River above the Ashurst-Hayden Diversion Dam during 1995 and 1996 survey efforts. The Little Colorado River and its tributary, Silver Creek have not been surveyed using the established protocol. Bird surveys were conducted along Silver Creek and the Little Colorado River below Silver Creek on April 7, May 19, June 2 and July 23, 1993, by Vera Walters (volunteer), but no *Empidonax* willow flycatchers were seen.

Appendix 5 of the biological evaluation summarizes the classification of riparian habitats on Phoenix resource planning area lands as either potential habitat or non-habitat for willow flycatchers. It also provides a brief explanation why areas are considered non-habitat. The data in appendix 5 of the biological evaluation indicate that the condition of occupied and potential habitat is as follows:

- Gila River: 14.2 miles in proper functioning condition; 2.9 miles functioning at risk.
- Little Colorado River: 3.3 miles functioning at risk; 2.0 miles non-functioning.
- Silver Creek: 1.9 miles functioning at risk.

The Service notes that Phoenix resource area lands include or are adjacent to designated critical habitat for the willow flycatcher on the Verde and Little Colorado Rivers and some of their tributaries. The biological evaluation indicates the determination that none of the currently critical habitat areas would be affected by the decisions in this document.

Effects of the Action

As mentioned previously, two qualitatively different classes of actions are identified in the RMP/EIS: "Action Decisions" and plan-level guidance and direction, including actions described in the biological evaluation as "Policy/Guidance" and "Decisions Providing Management Direction." Both classes of actions will be addressed separately in this analysis.

Action Decisions:

"Decisions that will result in Action" identified in the biological evaluation represent actions that would either benefit willow flycatchers or have no effect. These actions include AEC designations, confinement of motorized vehicles to designated roads and trails in AEC, Cultural Resource Management or Riparian Areas, closure of mineral location land in AEC, prohibition of surface occupancy for oil and gas development inside AEC, and prohibitions on land use authorizations in AEC.

Plan-level Direction, including Direction Decisions:

This following section includes discussion of the potential effects of the plan-level direction and guidance described in the BA. Effects of plan-level direction in the RMP/EIS are discussed by program area.

Land Tenure:

Direction in this area governs land disposal, acquisition, and exchanges. Acquisition and consolidation of land ownership could have beneficial effects on the willow flycatcher, especially when the object of the action is to enhance wildlife habitat values. Land disposal or exchanges could have adverse affects if they involve willow flycatcher habitat. The RMP/EIS provides that any land identified for disposal must be evaluated for significant threatened and endangered species resources before transfer of land is completed. Survey and mapping requirements of the new direction will assist in determining whether suitable or potential southwestern willow flycatcher habitat exists on lands considered for disposal or transfer.

Special Management Areas:

Management direction in this area pertains to designation of RCA and Riparian Management Areas, development of activity plans for such areas, and implementation of the research agreements. This direction is likely to result in beneficial effects to the southwestern willow flycatcher.

Land Use Authorizations:

These authorizations concern utility corridors, communication sites, and rights-of-way. Limiting rights-of-way and communication facilities to existing corridors and sites may limit the increase of impacts. The designation of two utility corridors that cross the Gila River in the White Canyon RCA are included in the RMP/ES. The survey, mapping, and habitat protection provided by the new direction should eliminate or greatly reduce any impacts from continuing or new land use authorizations. The biological evaluation indicates that communications sites are not likely to be developed in southwestern willow flycatcher habitat because they are generally located on high ground.

Minerals Management:

Mining activities under Minerals Management can result in surface-disturbing activities and the use of heavy equipment in potential southwestern willow flycatcher habitat. Protection from the impacts of these activities by mineral withdrawal in certain AECs is provided by the RMP/ES. Identification of important areas for willow flycatchers as a result of the new management direction will assist in considering areas for future mineral withdrawal.

Recreation:

Recreational activities can have adverse affects on southwestern willow flycatchers. Road and trail closures may result in decreased impacts in some areas. Recreational activities such as camping, picnicking, and hiking in riparian habitat during the nesting season can reduce reproductive success. Habitat management guidelines in the new management direction should assist in minimizing current impacts and in avoiding impacts in the future.

Rangeland Management and Wild, Free-roaming Burros:

Under the BLM's new direction in the management of southwestern willow flycatcher habitats will be a dynamic process. The categorization and mapping of habitats will have to be adjusted to reflect changes in habitat suitability and incorporation of additional data. The number and acreage of suitable and potential habitat areas will change due to natural riparian restoration processes, site potential, flood events which alter riparian vegetation and site capability, refinements in habitat definitions, and additional inventory/mapping efforts. The BLM will keep the Service apprised of these sorts of changes on a regular basis.

There are 22 allotments in BLM affected planning areas of Arizona that contain suitable willow flycatcher habitat that are either occupied or need further surveys to confirm occupancy. Plans are underway to implement long-term management strategies for all allotments that will comply with the following management direction. Direction on this issue (grazing use in occupied or suitable-unsurveyed habitats during the nesting season) will be fully implemented prior to the 1998 willow flycatcher nesting season. Concurrent with the adoption of these measures, the BLM is in the process of acquiring State and Federal permits necessary to conduct brown-headed cowbird trapping to minimize the effects of potential nest parasitism by this species on willow flycatchers.

Grazing by burros and livestock can potentially destroy or degrade the riparian habitat for willow flycatchers, primarily through the suppression of regeneration of potential habitat. Impacts can include severe impacts on willow flycatcher habitat composition and structure. Trampling may alter riparian plant communities by direct damage to plants, or by damaging soils. Plant densities, cover, biomass, vigor, and regeneration capacities may be reduced. Burros near willow flycatcher nesting areas increases the likelihood of cowbird parasitism of willow flycatcher nests by improving cowbird access to willow flycatcher nests. New management direction that will protect willow flycatchers from these impacts include: monitoring of suitable habitat through survey; breeding season exclusion of livestock grazing within occupied or unsurveyed suitable habitat so that it is not degraded; management of potential habitat to allow natural regeneration; and cowbird control measures when grazing occurs in or near occupied willow flycatcher habitat.

Activities carried out under the direction of Soil, Water, and Air Resource Management; and Wildlife, Special Status Species, and Riparian Management; Hazardous Material Management; Fire Management; and Cultural Resource Management are likely to have beneficial effects for the willow flycatcher and its habitat or to have no effect.

Cumulative Effects

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion.

Loss of habitat on private lands continues due to urbanization, agricultural clearing, habitat alteration and livestock grazing range wide. Nest parasitism by brown-headed cowbirds is likely to continue to be a problem with no easy solution. Mixed land ownership in the planning area and elsewhere limit Federal regulatory authority to control cowbirds. Given the scattered pattern of BLM lands and proximity of many holdings to developing areas, cumulative effects include continued grazing on private lands, water diversions that affect riparian habitat, and urban expansion.

Conclusion

After reviewing the current status of the willow flycatcher, the environmental baseline for the action area, the effects of the proposed action in conjunction with BLM's June 23, 1997, memorandum to the Service, and available information on cumulative affects, it is the Service's biological opinion that continuation of activities under the direction of the RMP/EIS are not likely to jeopardize the continued existence of the willow flycatcher. It also is the Service's biological opinion that this proposed action is not likely to destroy or adversely modify critical habitat of the willow flycatcher. The protection provided in the new direction should protect existing willow flycatchers and result in an increase of suitable habitat for recolonization.

Incidental Take

With the BLM's implementation of the conservation measures to provide new management direction for southwestern willow flycatchers in the RMP/EIS planning area, the Service does not anticipate that the proposed action will take any southwestern willow flycatchers.

Conservation Recommendation

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for willow flycatcher. In furtherance of the purposes of the Act, we recommend implementing the following actions:

1. The BLM should coordinate with the Service on the development of emergency protocols for response actions that occur within willow flycatcher habitat, or may otherwise affect the species on BLM lands, to develop possibilities for the minimization of impacts to and/or protection for the species.

2. The BLM should consider adding direction developed for the willow flycatcher to the RMP/EIS as an amendment when it is next amended, or to any future, comparable document that covers the planning area.
3. The BLM should assess the impacts of winter grazing on riparian habitat. Studies should assess whether riparian vegetation has had time to become established and has grown to sufficient size to withstand grazing pressures. Different areas should be assessed because of the variations of response that may occur in the areas.
4. The BLM should consider providing AEC status to willow flycatcher habitat in the next planning cycle for the Phoenix Resource Area.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendation.

LESSER LONG-NOSED BAT (*Leptonycteris curasoae yerbabuenae*)

Status of the Species (Range-Wide)

The lesser long-nosed bat was listed (originally, as *Leptonycteris sanborni*; Sanborn's long-nosed bat) as endangered on September 30, 1988 (53 FR 38456). No critical habitat has been designated for this species. The lesser long-nosed bat is a small, leaf-nosed bat. It has a long muzzle and a long tongue, and is capable of hover flight. These features are adaptations to feed on nectar from the flowers of columnar cactus, such as the saguaro and organ pipe cactus (*Lemaireocereus thurberi*), and from paniculate agaves, such as Palmer's agave, *Agave palmeri*, and Parry's agave, *A. parryi* (Hoffmeister 1986). Palmer's agave exhibits many characteristics of chiropterophily, such as nocturnal pollen dehiscence and nectar production, light colored and erect flowers, strong floral order, and high levels of pollen protein with relatively low levels of nectar sugar concentrations (Slauson 1996). Parry's agave demonstrates many (though not all) of these same morphological features (Gentry 1982). Slauson (1996) has demonstrated that nectar feeding bats are the principle pollinators defining seed set in Palmer's agave, though other pollinators may also be important.

The lesser long-nosed bat is migratory and found throughout its historic range from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. It has been recorded in southern Arizona from the Picacho Mountains (Pinal County) southwest to the Agua Dulce Mountains (Pima County), southeast to the Chiricahua Mountains (Cochise County), and south to the international boundary. Roosts in Arizona are occupied from late April to September (Cockrum and Petryszyn 1991); the bat is not known to be present during winter in Arizona (Hoffmeister 1986). In spring, adult females, most of which are pregnant, arrive in Arizona gathering into maternity colonies. These roosts are typically at low elevations near concentrations of flowering columnar cacti. After the young are weaned, these colonies disband in July and August. Some females and young move to higher elevations, primarily in the southeastern parts of Arizona near concentrations of blooming paniculate agaves. Adult males typically occupy separate

roosts forming bachelor colonies. Males are known mostly from the Chiricahua Mountains but also occur with adult females and young of the year at maternity sites (Fleming 1994).

As previously indicated, the lesser long-nosed bat consumes nectar and pollen of paniculate agave flowers and the nectar, pollen, and fruit produced by a variety of columnar cacti. These bats often forage in flocks. Throughout the night between foraging bouts both sexes will rest in temporary night roosts (Hoffmeister 1986). Nectar of these cacti and agaves are high energy foods. Concentrations of food resources appear to be distributed in patches on the landscape. The nectar of each plant species utilized is only seasonally available. Cacti flowers and fruit are available during the spring and early summer, and blooming agaves through the summer. Columnar cacti occur in lower elevation areas of the Sonoran Desert region. Paniculate agaves are found primarily in higher elevation desert areas, desert grasslands and shrublands, and into the oak woodland (Gentry 1982).

Lesser long-nosed bats appear to be opportunistic foragers and efficient fliers. The seasonally available food resources may account for the seasonal movement patterns of the bat. The lesser long-nosed bat is known to fly long distances from roost sites to foraging sites. Night flights from maternity colonies to flowering columnar cacti have been documented in Arizona at 15 miles, and in Mexico at 25 miles and 38 miles (Virginia Dalton, Tucson, Arizona, pers. comm. 1997; Yar Petryszyn, University of Arizona, Tucson, pers. comm. 1997). Fleming (1994) suggests that a substantial portion of the lesser long-nosed bats at the Pinacate Cave in Sonora fly 25 to 31 miles each night to foraging areas in Organ Pipe cactus National Park. Lesser long-nosed bats have been recorded visiting individual blooming Palmer's agaves in excess of 1,000 visits per night (Ronnie Sidner, Tucson, Arizona, pers. comm. 1997), while other agaves may not be visited at all (Liz Slauson, Desert Botanical Gardens, Phoenix, Arizona, pers. comm. 1997). Lesser long-nosed bats have been observed feeding at hummingbird feeders many miles from the closest potential roost site (Yar Petryszyn, pers. comm. 1997).

Loss of roost and foraging habitat, as well as direct taking of individual bats during animal control programs, particularly in Mexico, have contributed to the current endangered status of the species. Suitable day roosts and suitable concentrations of food plants are the two resources that are crucial for the lesser long-nosed bat (Fleming 1994). Caves and mines are used as day roosts. The factors that make roost sites useable have not yet been identified. Whatever the factors are that determine selection of roost locations, the species appears to be sensitive to human disturbance. Instances are known where a single brief visit to an occupied roost is sufficient to cause a high proportion of lesser long-nosed bats to temporarily abandon their day roost and move to another. Perhaps most disturbed bats return to their preferred roost in a few days. However, this sensitivity suggests that the presence of alternate roost sites may be critical when disturbance occurs. Interspecific interactions with other bat species may also influence lesser long-nosed bat roost requirements.

Known major roost sites include 16 large roosts in Arizona and Mexico (Fleming 1995). According to surveys conducted in 1992 and 1993, the number of bats estimated to occupy these sites was greater than 200,000. Twelve major maternity roost sites are known for Arizona and Mexico. According to the same surveys, the maternity roosts are

occupied by over 150,000 lesser long-nosed bats. The numbers above indicate that although there may be relatively large numbers of these bats known to exist, the relative number of known large roosts is small. Disturbance of these roosts and the food plants associated with them could lead to the loss of the roosts. The limited numbers of maternity roosts may be the critical factor in the survival of this species.

Status of the Species (In the Action Area)

One major maternity roost is within approximately 5 miles of the Phoenix resource planning area. A possible maternity roost is within the general planning area, but within Saguaro National Monument. Additionally, three known post-maternity roosts are within the RMP/EIS planning area and two more are within 15 to 20 miles of the RMP/EIS planning area (USFWS 1995). The majority of the south central portion of the resource planning area is within the 50 miles radius foraging distance, described in the Recovery Plan, of all of these roosts.

Effects of the Action

As mentioned previously, two qualitatively different classes of actions are identified in the RMP/EIS: "Action Decisions" and "plan-level guidance and direction, including actions described in the biological evaluation as "Policy/Guidance" and "Decisions Providing Management Direction." Both classes of actions will be addressed separately in this analysis.

Some program areas (Special Management Area; Soil, Water, and Air Resources; Wildlife; Special Status Species and Riparian Management; Hazardous Material Management; and Cultural Resource Management) do not significantly affect the lesser long-nosed bat, or are generally beneficial to the species. These are not discussed here further. Some decisions direct further planning and defer specific direction and the biological evaluation states that specific actions will be further analyzed at the project-level. The largest potential adverse effect of any activity is the loss of important food sources, columnar cacti and agave. The effects of each program area are analyzed below.

Land Use Management:

The land classification decisions in the RMP/EIS do not have specific guidance for the lesser long-nosed bat. Some land classifications direct activities within or near known and potential roosts and foraging habitat. The following land designations that may affect the lesser-long nosed bat are within the 50 miles foraging distance: Silver Bell RCA, Picacho Mountains RCA, and Baboquivari RCA, White Canyon RCA, Coyote Mountains RMA, Cocoraque Butte-Waterman Mountains Multiple RMA, Agua Blanco Ranch Mountains RMA, Gray Back-Box O Wash Mountains RMA, Santan Mountains Cooperative RMA, Tortolita Mountains Cooperative RMA, Sawtooth Mountains Cooperative RMA, Picacho R&PPA, Saginaw Hill R&PPA, and Tucson Mountain Park Extension R&PPA.

The consolidation of management through land acquisitions would be expected to benefit the bat. However, transfer of lands to non-Federal ownership could result in changes in the

management direction and regulatory protections of lesser long-nosed bats and their habitats. Also, land use designations, such as utility corridors and right-of-ways may result in the local loss of food plants and foraging habitat.

Minerals Management:

Mineral entry prohibitions in the Appleton-Whittell AEC and minerals withdrawals and surface occupancy prohibitions within the Baboquivari AEC and Waterman Mountains AEC may benefit the species and surface occupancy prohibitions within the White Canyon AEC. Except where specific direction applies, minerals exploration, development, and leases will continue throughout the resource planning area. Direction is not contained in the RMP/ES regarding mineral exploration or approval of plans of operation and leases in listed species habitats, including lesser long-nosed bats. Such activities may result in the loss of roosting and/or foraging habitat.

Rangeland Management:

Grazing may affect habitat for the lesser long-nosed bat in RMP/EIS planning areas. These areas contain saguaro cactus, but not agave, and grazing is dispersed. Livestock may inhibit survival of saguaro cactus by trampling seedlings under nurse plants (palo verde, ironwood, mesquite, etc.), by grazing nurse plants and removing protective cover, or by grazing the seedlings themselves. This effect is most likely to occur on relatively flat terrain. Small individual saguaros could be eaten or trampled should they occur in an area where livestock concentrate; e.g., around water sources. Much of the saguaro occurrence in the planning area is on relatively steep, rocky slopes where livestock use is infrequent and dispersed. Steep, rocky terrain inhibits cattle utilization of saguaro and shelters seedlings from trampling. These impacts are further tempered by the policy and guidance decisions and objectives that emphasize the improvement of watershed conditions.

Wild, Free-roaming Burros:

Although the Lake Pleasant Burro Management Area is beyond 50 miles from the nearest known roost site, burro grazing may reduce the amount of potential foraging habitat.

Recreation Management:

Other than specific closure areas and vehicle use limitations within certain areas, no specific guidance is given for recreation such as campground, road, and trail development and use. All of these activities may result in the loss of food plants. One potential maternity roost site and a few more post-maternity roost sites occur within the resource planning area. Recreational caving, hiking, or rock climbing may harass bats at these roosts.

Cumulative Effects

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered here because they require separate consultation pursuant to section 7 of the Act. Given the scattered pattern of BLM lands and proximity to many holdings to developing areas, the Service anticipates the cumulative effects that may impact the lesser long-nosed bats and their habitats include overgrazing, urban, rural, recreational, and agricultural development.

Conclusion

After reviewing the current status of the lesser long-nosed bats, the environmental baseline for the action area, the effects of the proposed action, effects of the proposed action, and available information on cumulative effects, it is the Service's biological opinion that continuation of activities under the direction of the RMP/EIS is not likely to jeopardize the continued existence of the lesser long-nosed bat. Critical habitat has not been designated.

Incidental Take

Amount of Take

The Service anticipates incidental take of the lesser long-nosed bat will be difficult to detect for the following reasons: the species is wide-ranging and has small body size, finding a dead or impaired specimen is unlikely, losses may be masked by seasonal fluctuations in numbers or use of habitat, and the species roosts in habitat where detection is difficult. However, the following level of take of this species can be anticipated by loss of food plants due to livestock grazing, and grazing improvement maintenance activities. The effect of cattle on the landscape can be conceived of being associated with the grazing preference numbers and the improvement maintenance. The anticipated level of incidental take in terms of these surrogate measures is expressed as maintenance of the current numbers and status of improvements. If the preference is increased or if additional improvements are constructed in foraging habitat, beyond those existing at present, this level of incidental take would be exceeded.

Effect of the Take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to result in jeopardy to the species.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the lesser long-nosed bat:

1. Loss of lesser long-nosed bat food plants will be avoided to the greatest extent possible from grazing activities, including maintenance of livestock improvements.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the BLM must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

1. The following terms and conditions will implement the reasonable and prudent measure above:
 - a. Assess the amount of food plants currently present within areas where livestock grazing is occurring. Adjust livestock grazing levels in order to maintain current levels of food plants for the bat.
 - b. Grazing levels will not be increased until it is known that there is an upward trend in available food plants in an area.

Conservation Recommendations

Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service recommends that the following conservation recommendations be implemented by the BLM.

1. Protect, monitor, and survey major roost sites .
2. Develop a management plan for BLM administered areas within a radius of 50 miles (81 kilometers) around known roosts. The above reasonable and prudent measures, terms and conditions will be used as the bases for such a management plan.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendation.

INCIDENTAL TAKE STATEMENT

Amounts of incidental take, reasonable and prudent measures, and terms and conditions are provided in the foregoing biological opinions for each listed species and are not repeated here. Sections 4(d) and 9 of the Act, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such a breeding, feeding and sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which

include, but are not limited to, breeding, feeding or sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

Sections 7(b)(4) and 7(o)(2) of the Act do not apply to the incidental take of listed plant species. However, protection of listed plants is provided to the extent that the Act requires a Federal permit for removal or reduction to possession of endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage, or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

REINITIATION STATEMENT

This concludes formal consultation on the action described in your request. As provided by 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

cc: State Director, Bureau of Land Management, Phoenix, Arizona
 Regional Director, Region 1, Portland, Oregon
 Chief, Division of Endangered Species, Washington, D.C.
 Geographic Manager, New Mexico, Region 2, Albuquerque, New Mexico
 Chief, Ecological Services, Region 2, Albuquerque, New Mexico
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